

# Chapter 21 Firewall Forward – Continental IO-550N

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## 21.1 Introduction

This chapter describes the firewall forward installation for the Continental IO-550N engine. This chapter completes the firewall forward construction for your ES airplane.

Before you start this chapter, we provide an overview of the forward side of the firewall so you can view the locations for mounting and connecting the ES systems.

Also, you need to refer to the *Supplement – Installing the ES Engine Mount and Nose Gear* before you start this chapter.

### Steps to Completion

The construction procedures in this chapter will complete the following items:

- Mount the engine and install the engine exhaust
- All baffling and the baffling seal
- Engine primary control systems including the throttle, mixture control and prop governor cable
- Fuel systems including the gascolator, the fuel lines, and all drain lines
- Engine oil systems including the oil pressure and sensor, and the oil breather lines
- Manifold pressure
- Induction air filter
- Propeller and spinner
- Cowling with the oil door
- Optional vacuum pump

### A Word about Sanding and Cleaning

The instructions in this chapter refer to preparing a surface or preparing a bonding area. When we recommend preparing a surface or a bonding area, we expect each of the following steps to be completed every time.

1. Sand the area using 40-grit sandpaper.
2. Vacuum all sanded areas.
3. Clean all sanded surfaces with Acetone.

## 21.2 Parts List

Blueprints needed for this chapter include:

- A3586 – Firewall template (or blueprint)
- A-504 – Gascolator template (supplied with gascolator)
- BP-A-593 – Spinner bulkhead
- BP-A-595 – Spinner template

### Engine Mounting – Kit #EM-550A

Item	Part Number	QTY	Description
1)	<del>J-9613-54 (Lord)</del> <u>94001-01 (Barry high temp)</u> - Or - 94011-20 (Barry <u>low temp</u> )	4	Engine Mount Vibration Isolator Kit
2)	AN7-33A	4	Bolt - undrilled
3)	AN970-7	4	Washer - flat

### Engine Exhaust – Kit EX-6

Item	Part Number	QTY	Description
1)	EX-6	1	Engine exhaust

### Baffling – Kit LES-550-BF

Item	Part Number	QTY	Description
1)	3568-000	1	Front Lower Shroud
2)	3568-001	1	Front Upper Shroud
3)	3568-002	1	Forward Left Shroud
4)	3568-003	1	Forward Right Shroud
5)	3568-006	1	Left Deck
6)	3568-007	1	Right Deck
7)	3568-010	1	Left Wing
8)	3568-011	1	Right Wing

### Baffling – Kit LES-550-BF (Continued)

Item	Part Number	QTY	Description
9)	4851-011	2	Standoff
10)	3568-014	1	Oil Cooler Box Door
11)	4851-016	1	Front Left Inner Baffle
12)	4851-018	1	Right Rear Inner Baffle
13)	3568-023	1	Bracket
14)	4851-023	1	Left Rear Inner Baffle
15)	4851-024	1	Front Right Inner Baffle
16)	4851-025	1	
17)	4851-026	1	Bracket (for front shroud)
18)	4851-027	1	Bracket (for front shroud)
19)	3568-030	1	Right Front Outer Baffle
20)	3568-031	1	Lower Oil Cooler Box Baffle
21)	4851-035	1	Left Front Outer Baffle
22)	4851-036	1	Stand Off
23)	4851-037	1	Stand Off
24)	FM-567-038	1	Bracket for lightweight starter
25)	3568-038	1	Rear center brace
26)	3568-040	6	Deck Brackets
27)	3568-041	6	EGT Support Bracket
28)	3568-042	2	Drainline Support Bracket
29)	3568-043	4	Oil line Support Bracket
30)	3568-044	4	Oil line Support Bracket
31)	FM-567-057	1	Rear Right Vertical Baffle
32)	FM-567-058	1	Rear Left Vertical Baffle
33)	FM-567-063	1	“L” Bracket Oil Cooler
34)	FM-567-064	1	Oil Cooler Box



**Baffling – Kit LES-550-BF (Continued)**

Item	Part Number	QTY	Description
35)	BF-MT-3	20 ft.	Baffling Seal, 3” wide, orange
36)	05-16100	1	Terminal Bolt Kit 3/16” drilled shank
37)	AD42ABSLF	120	Rivets - pop 1/8” alum. large head
38)	AN3-3A	70	Bolt - undrilled 10-32 x 15/32 x 1/16
39)	AN363-1032	10	Locknut, steel, hi-temp 10-32
40)	AN364-832A	1	Nut - elastic stop 8-32
41)	AN426A3-4	170	Rivets - soft 3/32 x 1/4
42)	AN426AD3-8	6	Rivets - hard 100 3/32 x 1/2
43)	AN500-A416-6	8	Screw - fillister head
44)	AN742D4	1	Clamp - loop plain 1/4 tube O.D.
45)	AN960-08L	1	Washer 8, thin, flat
46)	AN960-10	55	Washer - flat 3/16 (.203)
47)	AN960-10L	20	Washer - thin, flat 3/16
48)	AN960-616	1	Washer - flat 3/8 (.390)
49)	BSPQ-44	20	Rivets - pop 1/8 x .250
50)	K1000-3	60	Nutplate/anchor - two lug metal 10-32
51)	MS20001	3	Hinge - continuous aluminum (piano hinge)
52)	MS20074-06-05	1	Bolt - coarse thread 3/8-16
53)	MS35333-38	1	Washer - star internal teeth #8
54)	MS35338-44	6	Washer - split helical lock 1/4
55)	MS35489-18	3	Grommet - syn/rubber 5/8 x 1-1/2 x 1-1/2 x 1/4
56)	MS35649-202	2	Nut - plain hexagon
57)	RC1023	1	Grommet - linear
58)	SCAT-4	5 ft.	Tubing - SCAT 1.0” I.D.
59)	SCAT-6	2.5 ft.	Tubing - SCAT 1.5” I.D.

**Fuel Pump– Kit 518-IO550**

Item	Part Number	QTY	Description
1)	518-02	1	Fuel pump shield
2)	518-03	1	Stub for fuel pump shield
3)	<del>145-0004</del> 5416K15	2	Clamp - hose 13/16” to 1-1/2”
4)	561-1	1	Flange tube aluminum 1” scat
5)	AN364-832A	1	Locknut, elastic stop 8-32
6)	AN960-8L	2	Washer - #8 thin, flat
7)	MS21042-08	2	Nut - all metal stop 8-32
8)	MS35333-38	1	Washer - star internal teeth #8
9)	MSC-32	3	Pop rivets
10)	Scat-4	2	Scat tubing 1” I.D.

**Engine Control Systems – Cable-IO550**

Item	Part Number	QTY	Description
1)	31509	3	Clamp - engine mount control cable
2)	565-02	1	Bracket - mixture control cable
3)	<del>106-0016</del> 91150A114	2	Washer - locking 3/8 zinc
4)	<del>103-0026</del> 91811A031	1	Nut - 3/8-24 coupling
5)	A750-BU-5	5 ft.	Cable - propeller control (blue)
6)	A750-RD-5	5 ft.	Cable - mixture (red)
7)	A800-BK-5	5 ft.	Cable - throttle (black)
8)	AN3-10A	1	Bolt - 10-32 x 5/8
9)	AN3-11A	2	Bolt - 10-32 x 1 x 1/8 undrilled
10)	AN315-3	3	Checknut
11)	AN3-3A	2	Bolt - 10-32 x 15/32 x 1/16
12)	AN3-4A	2	Bolt - 10-32 x 17/32 x 1/8
13)	AN3-7A	2	Bolt - 10-32 x 29/32 x 1/2



**Engine Control Systems – Cable-IO550 (Continued)**

Item	Part Number	QTY	Description
14)	AN315-3	3	Nut - full hex 10-32 thread
15)	AN363-1032	10	Nut - steel stop hi-temp 10-32
16)	AN6-5A	1	Bolt - 3/8-24 x 45/64L
17)	AN960-10	19	Washer - flat 3/16 (.203)
18)	AN960-10L	2	Washer - flat, thin 3/16
19)	AN960-616	1	Washer - flat 3/8 (.390)
20)	AN970-3	3	Washer - flat 3/16 x .875
21)	AN970-6	2	Washer - flat 3/8 x 1/625
22)	HFC-3	3	Bearing - rod end throttle cable
23)	PG564	1	Bracket - prop governor cable
24)	SP565	1	Spacer - engine mount control cables
25)	TB563	1	Bracket - throttle cable
26)	MS35489-11	3	Grommet - syn/rubber, 3/8 x 7/8 x 5/8 x 5/16

**Manifold Pressure and Tachometer**

Item	Part Number	QTY	Description
1)	C5205x4x4	1	Fitting
2)	MS27404-4D	2	Fitting
3)	193-4	1	Hose

**Gascolator**

Item	Part Number	QTY	Description
1)	<del>GAS-500F-BYP 504</del>	1	Gascolator
2)	504-06	1	Attach Bracket
3)	504-07	1	Gascolator Shroud
4)	<del>145-0003 5416K14</del>	2	Clamp - hose 1.0”

**Gascolator (Continued)**

Item	Part Number	QTY	Description
5)	AN3-3A	3	Bolt - 10-32 x 15/32 x 1/16
6)	AN3H11A	4	Bolts
7)	AN426A3-5	6	Rivets
8)	AN960-10	10	Washer - flat 3/16 (.203)
9)	C5205x8x8	2	Fitting adapter male 1/2 - 1/2
10)	K1000-3	3	Nutplates
11)	SCAT-4	2 ft.	Tubing SCAT 1.0”
12)	<del>2240-4-8S</del>	<del>1</del>	<del>Bulkhead Flare Fitting - gascolator to firewall</del>

**Fuel Systems**

Item	Part Number	QTY	Description
1)	4890	28”	Fuel Supply Line
2)	AN912-1D	1	Bushing Reducer
3)	<del>145-0003 5416K14</del>	2	Clamp - hose
4)	MS21919-DG32	2	Clamp
5)	MS21919-DG10	2	Clamp
6)	AN624-4D	1	Fitting - T
7)	AN816-4-4	2	Fitting
8)	AN822-4D	1	Fitting - elbow
9)	AN822-4	1	Fitting - elbow
10)	2240-6-8S	1	Fitting - bulkhead
11)	561-1	1	Flange - inlet
12)	510A	4	Fuel Return Line
13)	193-4	7’	Fuel distributor Drain Line
14)	530	21”	Fuel Line
15)	A500	1	Andair Gascolator
16)	MS35489-13	1	Grommet





**Fuel Systems (Continued)**

Item	Part Number	QTY	Description
17)	AN931-12-23	1	Grommet
18)	514	1	Hose - prebuilt
19)	515	1	Hose - prebuilt
20)	516	1	Hose - prebuilt
21)	K3000-3	3	Nutplate
22)	AN913-ID	1	Plug
23)	MSC-32	4	Rivets - pop
24)	AN426A3-4	6	Rivets
25)	SCAT4	1	Tubing - flexible
26)	AN960-6D	1	Washer
27)	<u>145-0000</u> <del>5321K14</del>		<u>Drain line clamps</u>

**Oil Systems**

Item	Part Number	QTY	Description
1)	<u>165-0000</u> <del>8500K83</del>	1	Anti-chafe Material
2)	AN3-7A	1	Bolt - undrilled
3)	MS21919-DG16	1	Clamp
4)	<u>145-0003</u> <del>5416K14</del>	1	Clamp
5)	AN912-3	1	Coupling - steel
6)	HK822-4	1	Fitting (with .05” restriction)
7)	AN363-1032A	1	Locknut - nylon
8)	124F001-4CR0160	16”	Oil Pressure Line
9)	MIL-H-6000x3/4	1	Oil Breather Line
10)	AN960-10	1	Washer - flat

**Propeller/Spinner – Kit SP-ASSY-550**

Item	Part Number	QTY	Description
1)	1026B-12-12	1	Prepreg - 2 ply 1/4” +45 12x12
2)	1054-1	1	Spinner
3)	1054-2	1	Plate Spinner Backup
4)	AN426A3-5	50	Rivet - soft 100DEG 3/32 x 5/16
5)	AN526-1032-R10	18	Screw - truss head 10/32 x 5/8
6)	AN960-10L	18	Washer - flat thin 3/16
7)	K1000-06	6	Nut - anchor two lug metal 6-32
8)	K1000-3	18	Nut - anchor two lug metal 10-32
9)	MS24693-S28	6	Screw - flat 6-32 x1/2
10)	PHC-J3YF-1RF/F7693DF	1	78” Diameter 3-bladed Hartzell Propeller

**Cowling**

Item	Part Number	QTY	Description
1)	2000B	1	Bottom cowl
2)	2000T	1	Top cowl
3)	H-5000-2	1	Hartwell flush steel latch
4)	MS2001	1	Hinge
5)	MS24694-S5	100	Screw - flat 8-32 x 17/32 countersunk
6)	<u>MSC-34</u>	<u>50</u>	Rivets
7)	<u>K1000-08</u>	<u>50</u>	Nutplates
8)	<u>802-0001</u>	<u>1</u>	<u>Oil door remote latch kit</u> <del>Latch cable</del>

**Air Induction – Kit 4867-A**

Item	Part Number	QTY	Description
1)	4867	1	Air induction tube - IO550
2)	4867-01	1	Lever arm



**Air Induction – Kit 4867-A (Continued)**

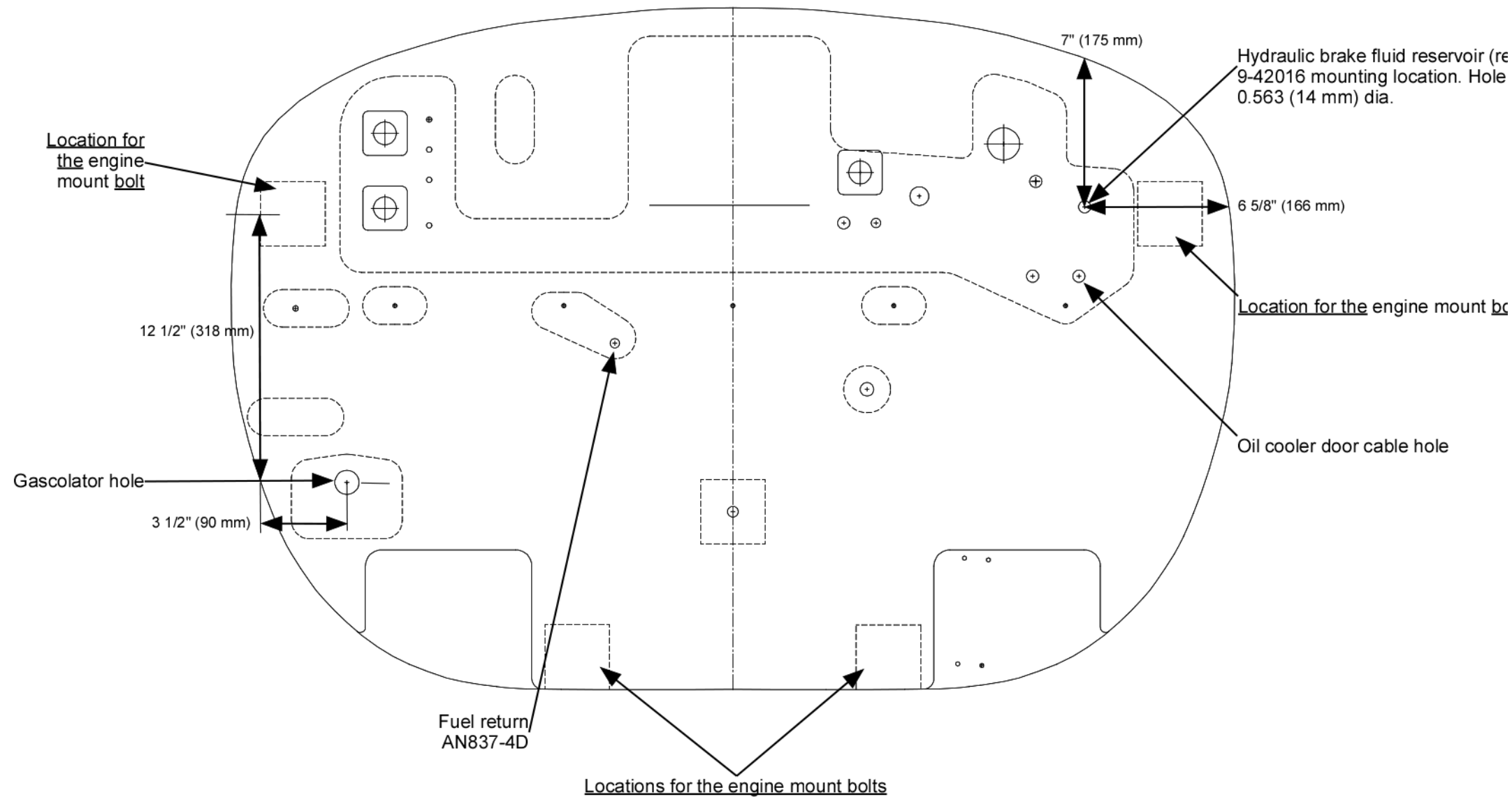
Item	Part Number	QTY	Description
3)	4869	1	Hose coupler for air filter
4)	4873	1	Bracket for attaching cable
5)	4874	1	Control cable, 6' with push button
6)	4878	1	Spacer
7)	<del>145-0009 5416K25</del>	2	Clamp - Hose 3" O.D.
8)	<del>101-0060 91251A153</del>	1	Screw - socket head 6-32 x 1
9)	AN3-4A	2	Bolt 10-32 x 17/32 x 1/8
10)	AN363-1032	2	Nut - steel stop Hi-temp 10-32
11)	AN363-524	2	Nut - steel all metal 5/16-24
12)	AN3-6A	1	Bolt 10-32 x 25/32 x 3/8
13)	AN3-7A	1	Bolt 10-32 x 29/32 x 1/2
14)	AN5-16A	1	Bolt - 5/16-24 x 1 x 3/8
15)	AN5-6A	1	Bolt - 5/16-24 x 27/32 x 3/16
16)	AN960-10	4	Washer - flat 3/16 (.203)
17)	AN960-10L	7	Washer - flat, thin 3/16
18)	AN960-516	3	Washer - flat 5/16 (.328)
19)	AN960-6	1	Washer - flat #6 (.149)
20)	HFC-3AU)	1	Bearing rod end - throttle cable
21)	MS21042-06	1	Nut - all metal stop 6-32
22)	MS21042-3	2	Nut - all metal stop 10-32
23)	MS21919-DG3	1	Clamp - Adel 3/16 cushioned
24)	MS35489-6	2	Grommet - syn/rubber 1/4 x 5/8 x 7/16 x 3/16
25)	RC2600	1	Air filter, high-flow cone type
26)	SHC-1010	1	Connector .25-.31 cord dia. 3/8
27)	SHC316-22-002	1	Locknut 3/8 NPT cord connector

**Vacuum System – Kit LES-550-VC (optional)**

Item	Part Number LES-550-VC	QTY	Description
1)	1058	1	Shroud vacuum pump cooling
2)	193-10	2	Hose - low pressure 5/8" I.D.
3)	193-4	3	Hose - low pressure 1/4" I.D.
4)	193-6	7	Hose - low pressure 3/8" I.D.
5)	1J7-1	1	Vacuum Pump Filter
6)	1K1-6-10	1	Fitting - Airborne 90
7)	1K8-6-10	1	Fitting - Airborne 135
8)	216CW	1	Pump vacuum
9)	2H3-12	1	Regulator for vacuum system
10)	<del>145-0001 5321K16</del>	10	Clamps - hose 1/2" O.D.
11)	<del>145-0003 5416K14</del>	2	Clamps - hose 1" O.D.
12)	AN840-4D	1	Hose nipple fitting 1/4-1/8
13)	AN840-6D	4	Hose nipple fitting 3/8-1/4



Figure 21.2.0.1 Forward side of the firewall with mounting locations, openings and dimensions



# 21.3 Construction Procedures

## 21.3.A Mounting the Engine

The Continental IO-550N can use either of the following two types of engine mount isolators.

- J-9613-54 provided by Lord
- 94001-01 High Temp provided by Barry (recommended)
- 94011-20 Low Temp provided by Barry

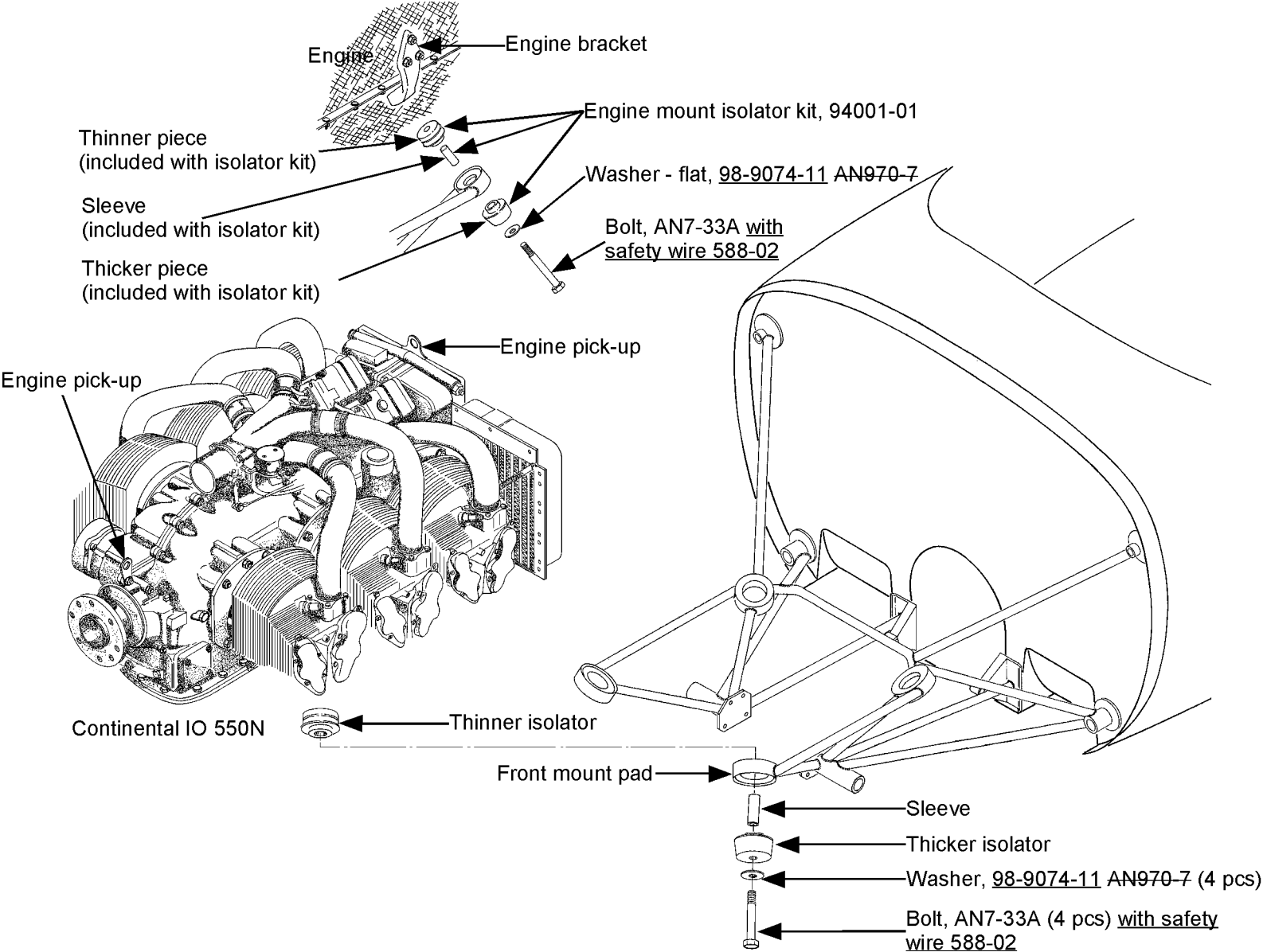
Each type of engine mount isolators consists of three pieces, a thinner isolator, a sleeve and a thicker isolator. Review Figure 21.3.A.1 to verify the installation location of each piece:

- Thin isolator is placed on the top (engine side) of the mount,
- Thick isolator is placed on the bottom (away from the engine) of the mount.

### Steps...

1. Position each of the four top vibration isolators on the four engine mount pads.
2. Gently ease the engine into place using a suitable hoist. Check with your local FBO to find out if you can borrow an engine hoist.

Figure 21.3.A.1 Installing the engine mounts and engine



3. As the front engine brackets make contact, hold some of the weight off while you install the remaining pieces: the sleeve, the thicker isolator and the washer (98-9074-11 ~~AN970-7~~) and the bolt (AN7-33A).

**Tip:** Aligning the engine bracket to the mount pads may require some wiggling.

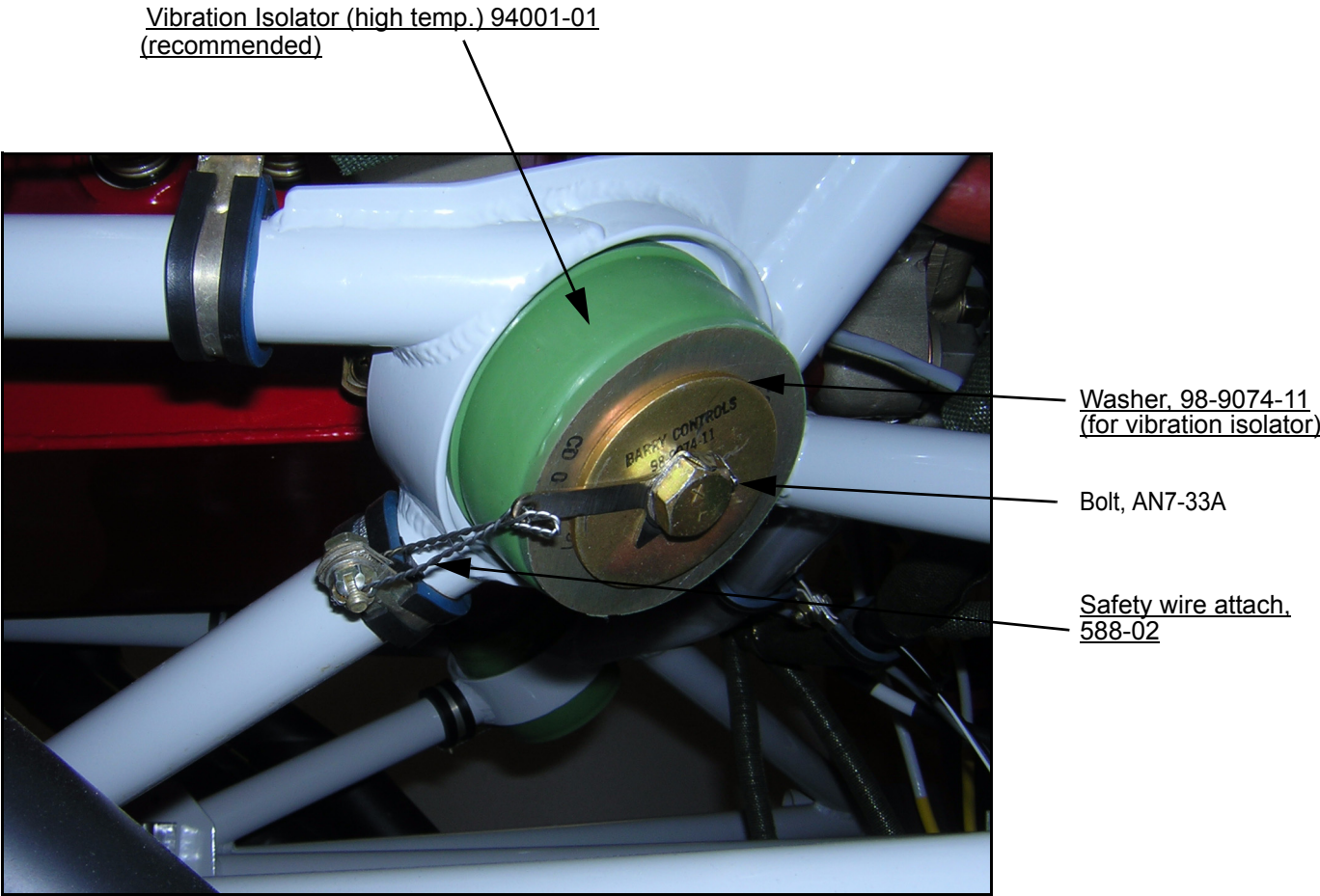
4. Continue by completing the installation of the aft engine mounts.

5. Torque the AN7-33A bolts to 400 in-lbs (35 ft.-lbs.).

**WARNING:** Do *NOT* forget the sleeves in the isolator assemblies!

This completes the engine mounting.

Figure 26.3.A.2 ~~Review this photo of the~~ Isolator placement and assembly





### 21.3.B Installing the Engine Exhaust

The custom exhaust system (EX-6) for the Lancair ES, with the IO-550N engine, is available through Lancair. All the hardware for mounting the exhaust is included with the exhaust system.

#### Steps...

1. Remove the plastic exhaust exit covers from underneath the cylinders.

Caution: Excess oil may spill out when you remove the exhaust exit covers.

2. Mount the upper pieces of the exhaust on both the left and right sides of the engine using the nuts and gaskets that came with the engine (only with new engines).

See Figure 21.3.B.2 Mounting the upper exhaust on the next page.

3. Mount the lower pieces of the exhaust using the hardware supplied with the engine exhaust kit. Make sure the pipes are even.

See Figure 21.3.B.3 on the next page.

4. Install the heat muff on the left exhaust.

5. Secure the lower portion of the exhaust to the firewall. Use the provided strap that came with the engine exhaust kit.

Figure 21.3.B.1 Engine exhaust

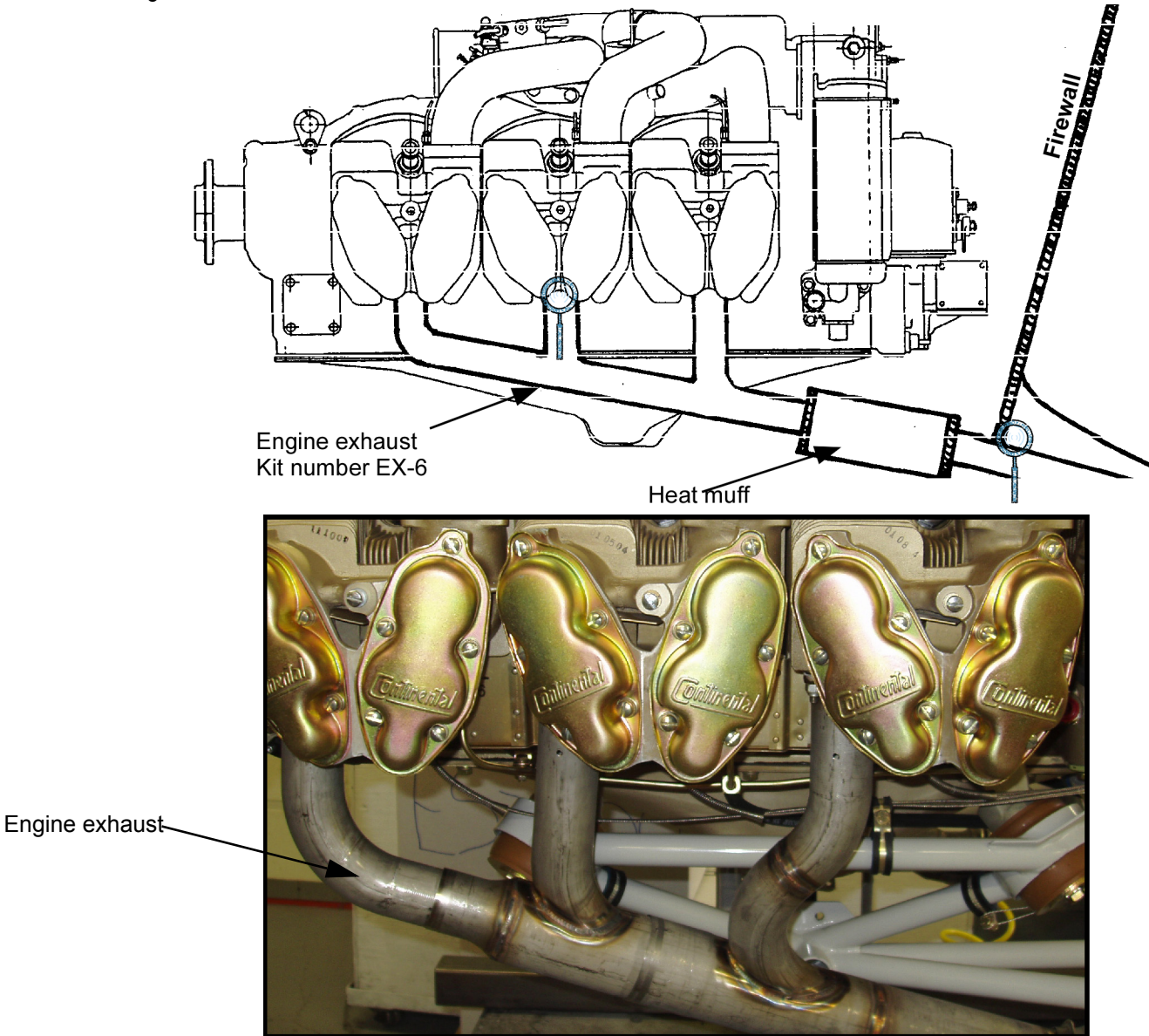


Figure 21.3.B.2 Mounting the upper exhaust

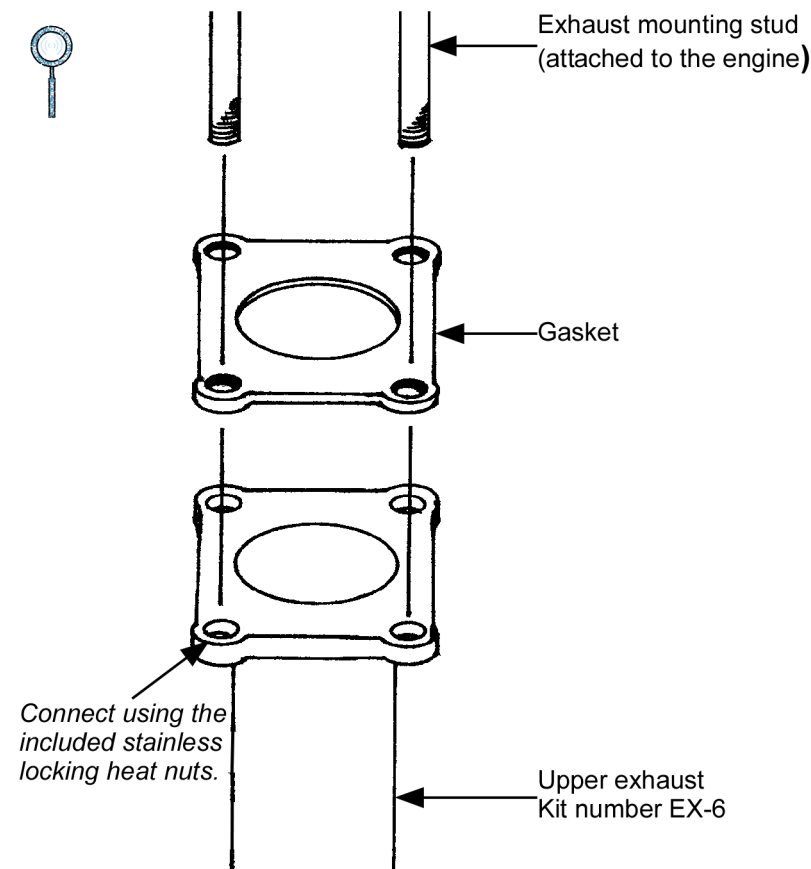
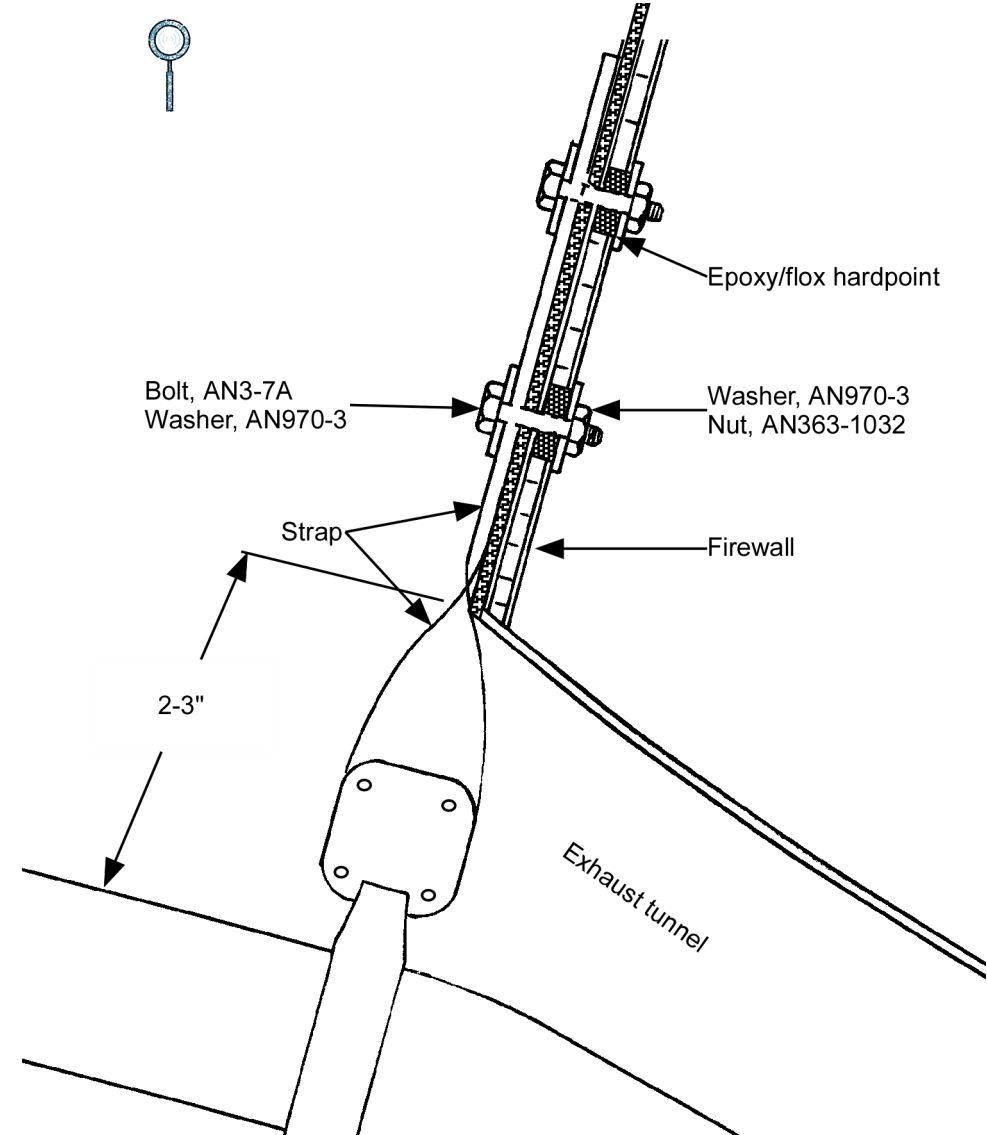


Figure 21.3.B.3 Securing the lower exhaust piece to the firewall





### 21.3.C Installing the Baffling

The Lancair baffling kit (LES-550-BF) for the Continental IO-550N engine includes all the pieces required to install the baffling. For a complete list of the ES baffling kit see the table on page 21.2. The baffling is designed to allow for easy installation and removal. Almost any part of the baffling can be removed without having to remove another piece.

As you unpack the baffling kit, the baffling appears to be a lot of odd pieces of aluminum. If you systematically assemble the baffling it is not too difficult to install. Some trimming of the pieces is required.

#### Factory installed baffling

The new factory Continental IO-550N engine comes with pre-installed center and lower cylinder baffles. These baffle parts are essential for proper engine cooling.

If you do not have a new factory engine, refer to 21.3.L *Factory Installed Baffling* on page 21.52 for information on installing these specific pieces.

#### Installation order

Although the baffling can be installed in any order, we suggest you follow the same order we use in this manual.

The following pieces are contained in the baffling kit but are not displayed in any of the illustrations.

Part Number	QTY	Description
3568-041	6	EGT support brackets
3568-042	2	Drain line support brackets
3568-043	4	Oil line support brackets
3568-044	4	Oil line support brackets3

Figure 21.3.C.1 Baffling layout – overview

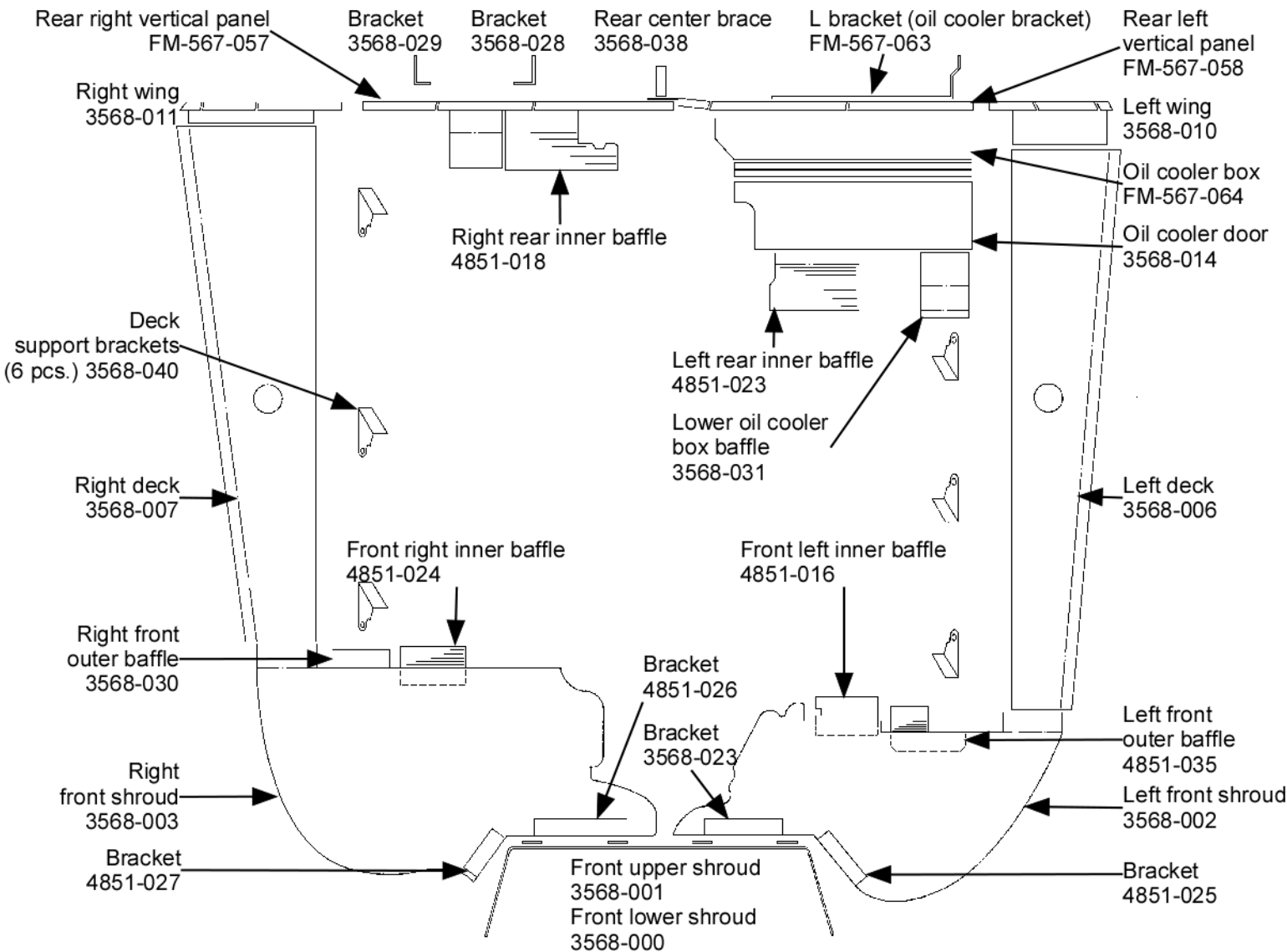


Figure 21.3.C.2 provides a detail view of the complete baffling layout as seen in the baffling overview on the previous page. The subsequent pages in this section provide a breakdown down of this figure into piece by piece assembly, in the order we suggest you use for installing the baffling.

Let's start by removing the baffling kit pieces from the box and arranging the pieces on your work surface.

**Fitting the baffling**

When installing the baffling it is particularly important to understand how the pieces fit together. The following fits are important.

- Oil cooler box fit – The oil cooler box (FM-567-064) fit needs to be checked to the left wing (3568-010) and the rear left vertical panel (FM-567-058).
- Oil cooler door fit – The oil cooler door (3568-014) needs to seal snugly against the rear left vertical panel (FM-567-058).
- Front shrouds – Rivets on the front outer edge of the two front shrouds must be at least 3/4" from the edge. This 3/4" is the amount of required space for securing the baffling seal.
- Baffling seal – The baffling seal pieces must lay inward against the cowling top to form a good seal that tightens when pressurized with ram air. If a flexible baffle were to get blown back, a massive air leak would result and the engine could easily overheat.

We recommend that you clamp each piece in place and verify the fit before drilling the bolt or rivet holes.

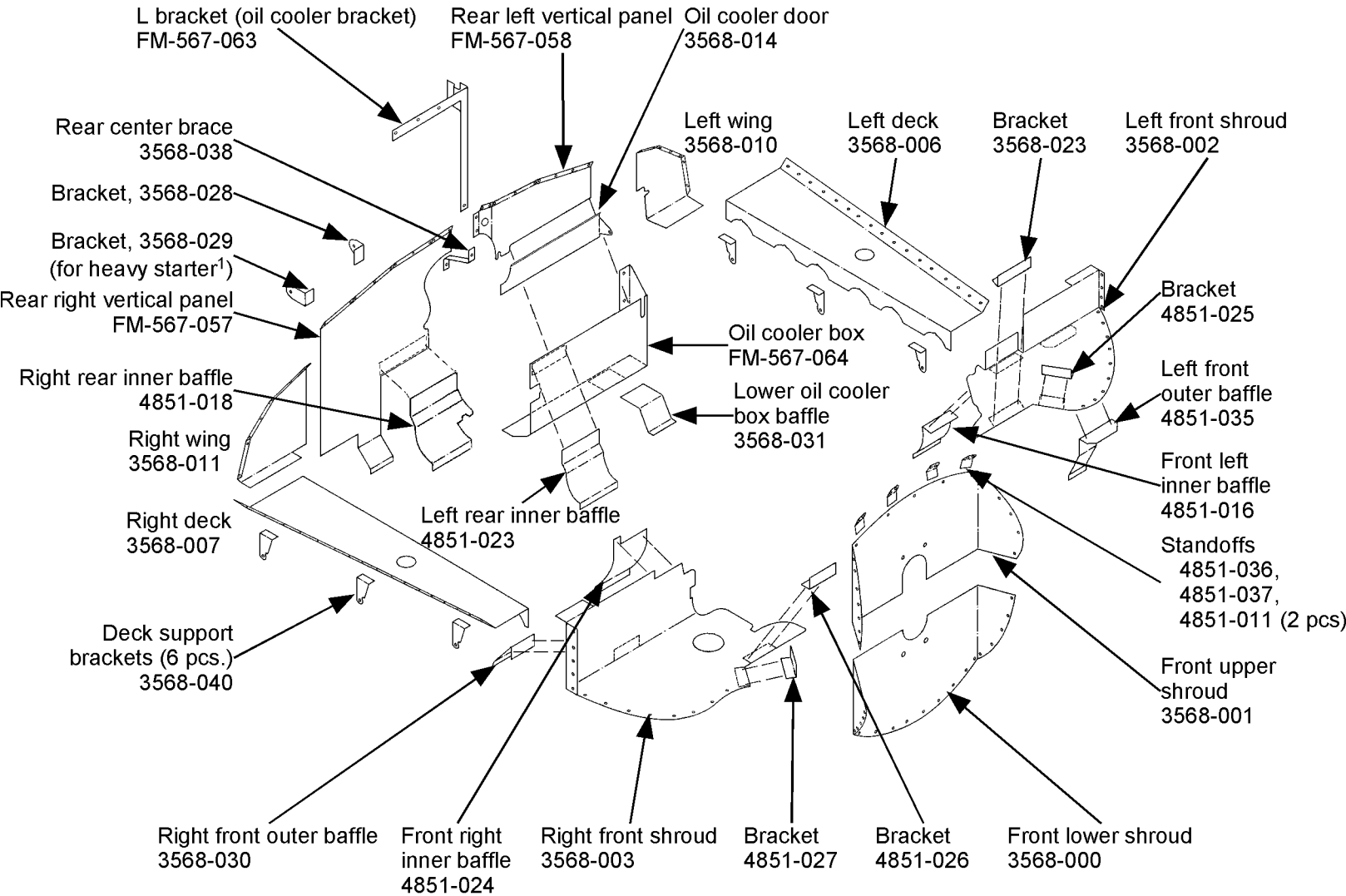


Pre-fit the baffle panels to the engine. Then fit the cowling to check the cowling clearance to the engine baffles. Don't use the baffling seal for this pre-fit.

Footnotes

1. 567-038      Light starter

Figure 21.3.C.2 Baffling layout – detail view



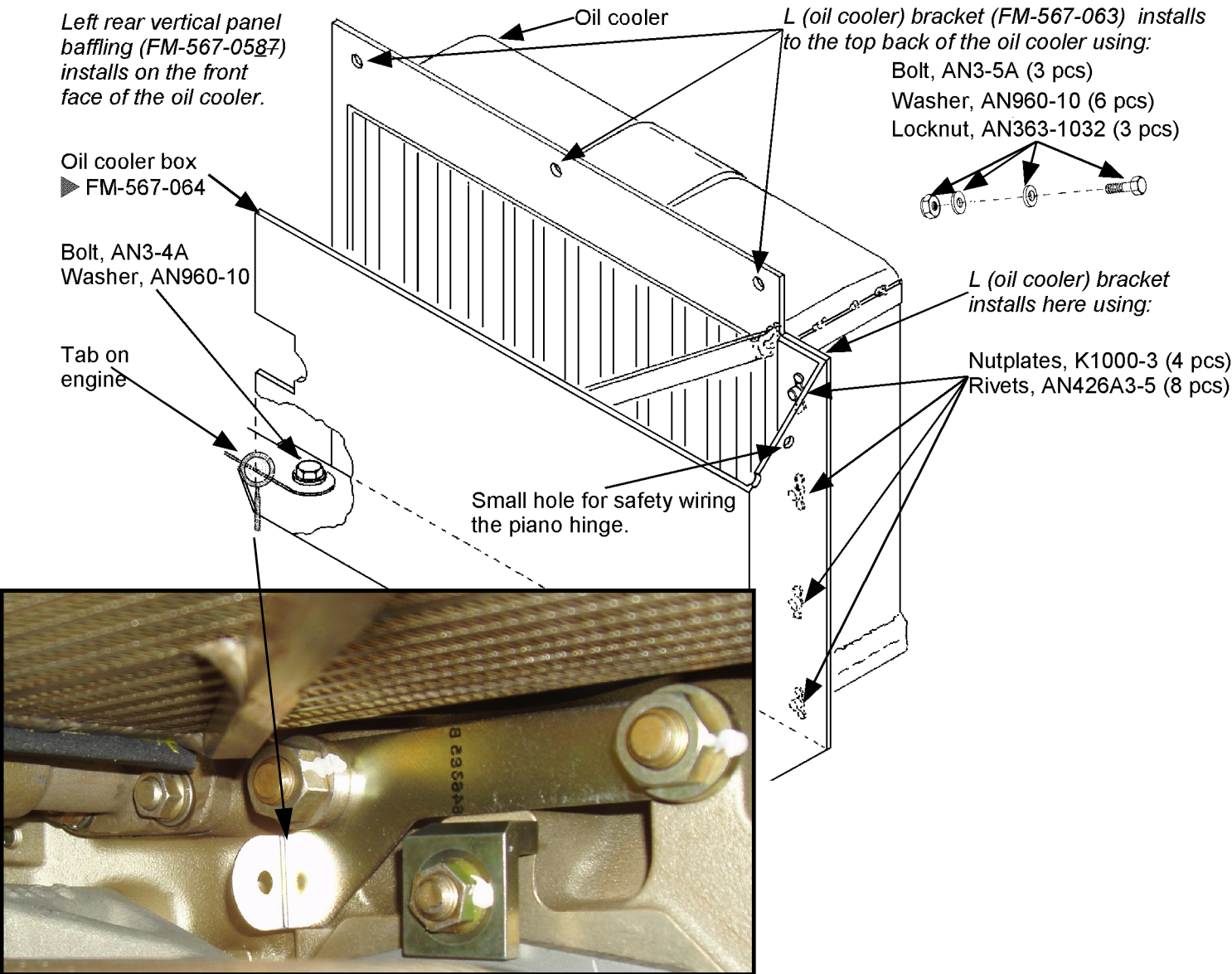
# Installing the Oil Cooler Box

When installing the oil cooler baffling it is particularly important to understand how the pieces fit together. A good fit is critical to achieve proper cooling. See *Fitting the baffling* on page 21.13 for details.

## Steps...

1. Fit the oil cooler box (FM-567-064) between the oil cooler and aft of cylinder 2.
2. Align the oil cooler box to its proper location and hold it in place.
3. Mark a hole on the oil cooler box for securing the box to the engine tab.  
Do this by holding the top of a felt pen and marking the oil cooler box at the location where the engine tab and the oil cooler box will be bolted together.  
**Tip:** The horizontal engine tab needs to be on top of the oil cooler box baffling.
4. Remove the oil cooler box and drill a 3/16" diameter hole in the oil cooler box.
5. Install the nutplate as shown in the magnified illustration.  
**Tip:** Due to slight variations of each engine, it may be necessary to file certain areas.
6. Align the L (oil cooler) bracket (FM-567-063) against the oil cooler. Install the left side using the K1000-3 nutplates (4 pcs) and the AN426A3-5 rivets (8 pcs) as shown in Figure 21.3.C.6.
7. Now install the rear left vertical panel (FM-567-058) on the front face of the oil cooler. Position the rear left panel as shown in Figure 21.3.C.11.  
The top cable bracket holes should align with the rear left vertical panel and the oil cooler. Use three AN3-5A bolts with the with the AN960-10 washers and the locknut, AN363-1032 to assemble the three pieces.

Figure 21.3.C.3 Oil cooler box install



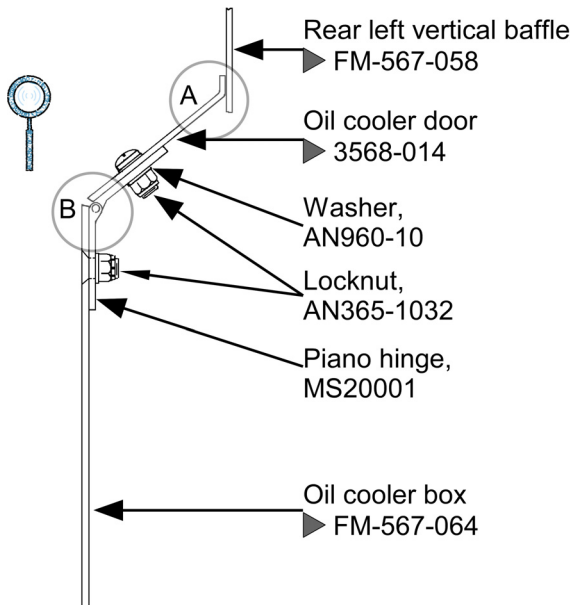
### Installing the Oil Cooler Door

Before you proceed, check the fit of the oil cooler door. It needs to seal snugly against the rear left vertical panel.

#### Steps...

1. Drill four holes on the front of the oil cooler box.
2. Insert four panhead screws (AN525-10R6).
3. Referring to the detail view below, see circle A for the fit of the installed oil cooler door (3568-014).
4. Insert the piano hinge and again test the fit of the oil cooler door.
5. Trim off the lower edge of the door to achieve a good fit. See circle B in the figure below.

Figure 21.3.C.4 Side view of the oil cooler box with door

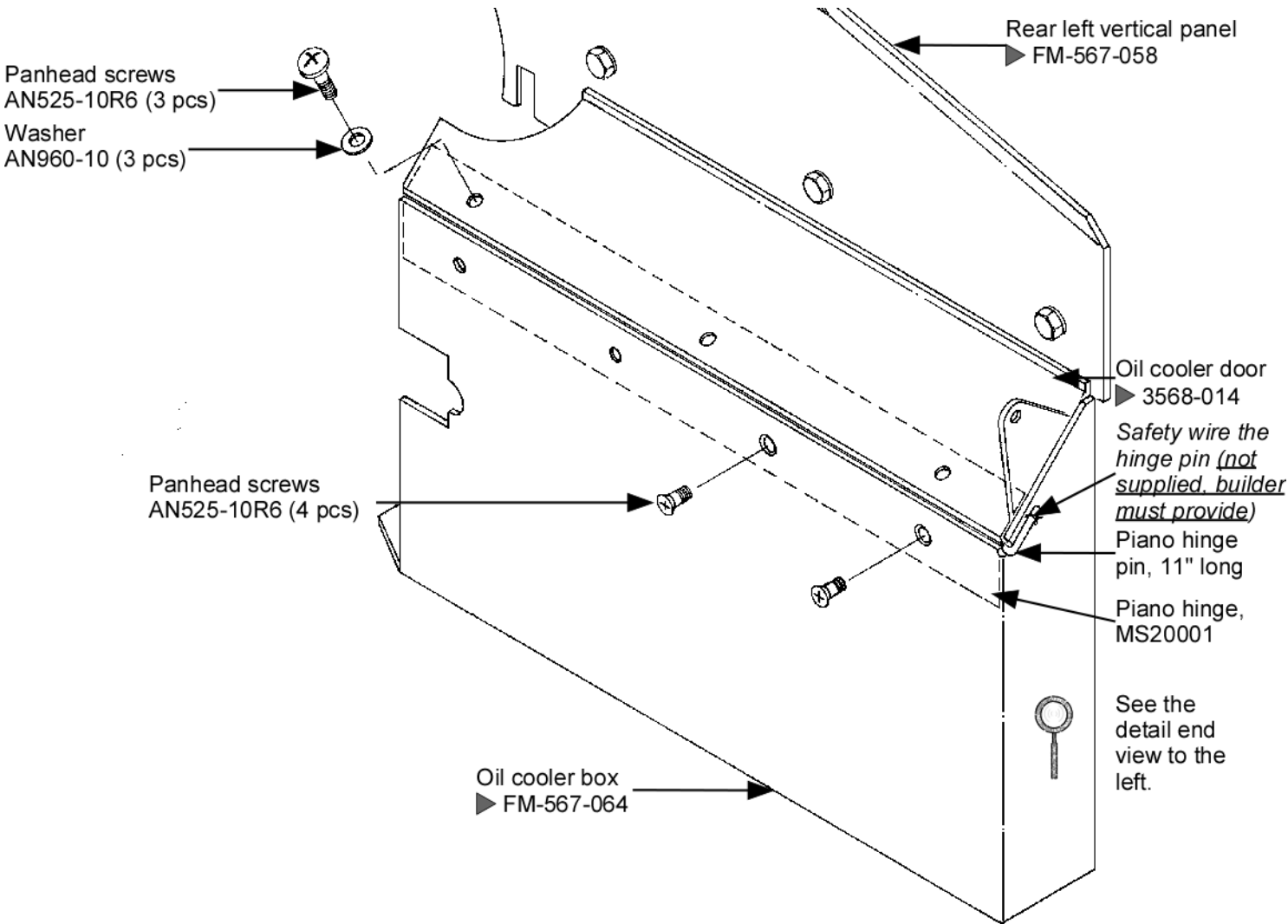


6. Now safety wire (not supplied, builder must provide) the piano hinge pin.



Review this photo of the hinge for the oil cooler door.

Figure 21.3.C.5 Oil cooler door



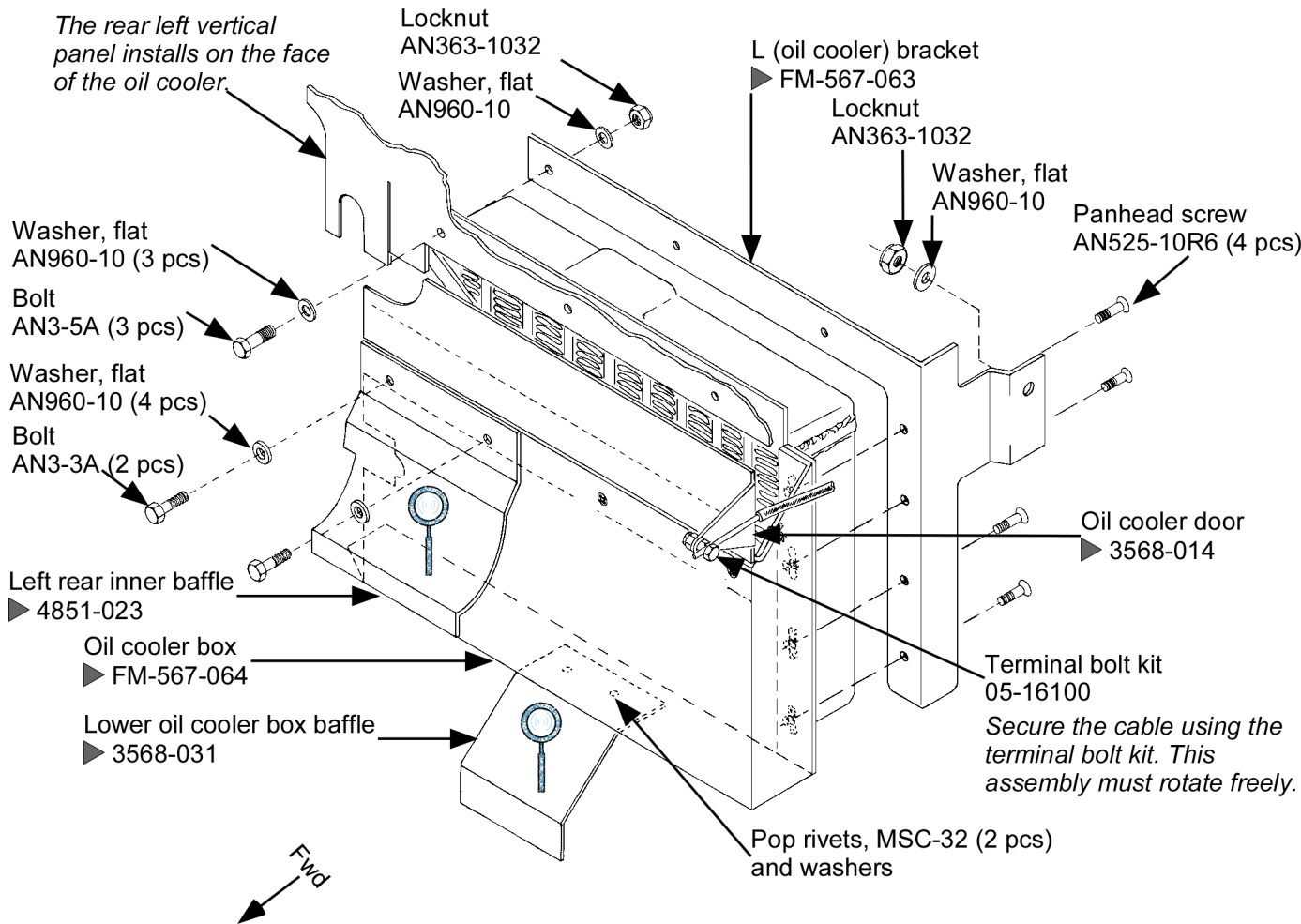


# Completing the Oil Cooler Box Installation

### Steps...

1. Align the lower oil cooler box baffle (3568-031) with the cylinder fins.
2. Install the lower oil cooler box baffle using pop rivets and washers.  
Refer to the detail view Figure 21.3.C.10 for positioning.
3. Install the terminal bolt kit (05-16100) on the oil cooler door (3568-014).  
The assembled terminal bolt kit must rotate freely.
4. Secure the end of the cable to the oil cooler door.  
This cable will run from the oil cooler door to the instrument panel. You will finish the cable installation along with the remaining pieces of the rear panel on page 21.20.

Figure 21.3.C.6 Oil cooler box



5. Position the left rear inner baffle (4851-023) against the oil cooler box and snugly against the cylinder.  
Secure the left rear inner baffle using two AN3-3A bolts and AN960-10 flat washers.  
Refer to the detail views on page 21.19 for positioning.

Figure 21.3.C.7 Oil cooler door and box installed with baffling

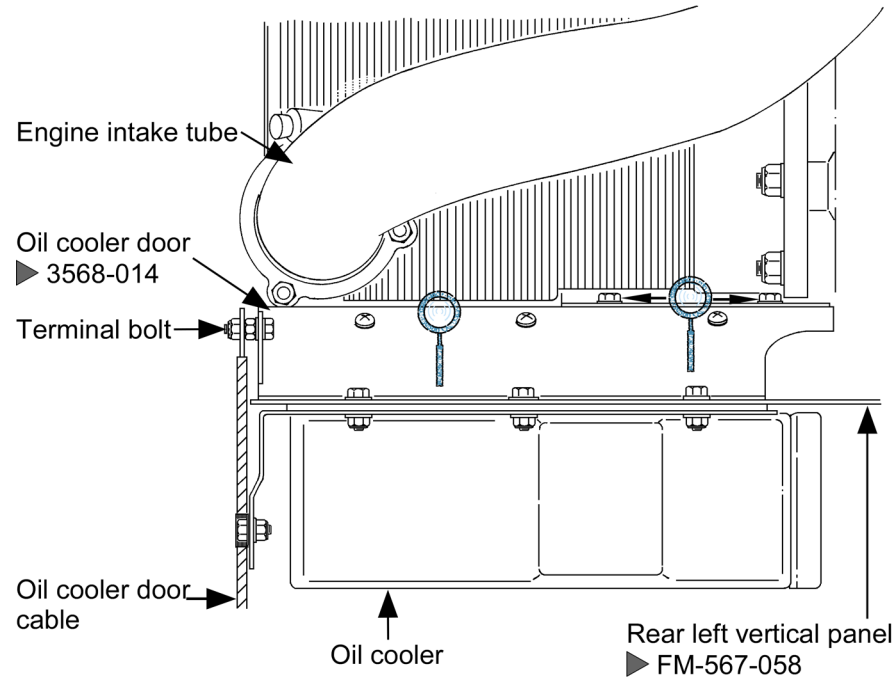




Figure 21.3.C.8 below is a top view of the oil cooler and the oil cooler door you just installed. The two magnifiers represent the position of the next baffling pieces in the two detail view illustrations, Figure 21.3.C.9 on the right side of this page and Figure 21.3.C.10 on the next page.

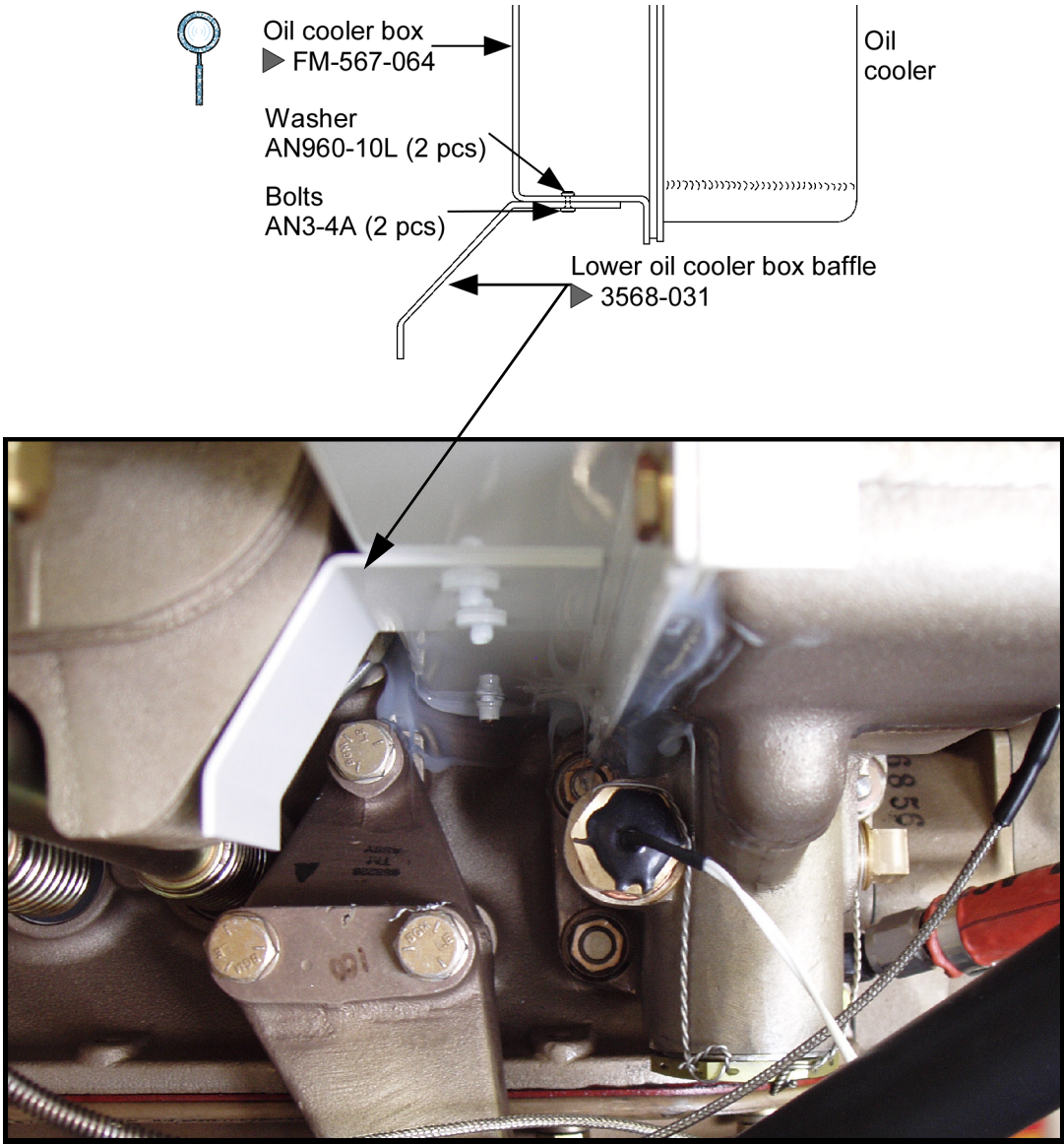
The first of these baffling pieces attaches to the bottom of the oil cooler box. It is the lower cooler box baffle (3568-031).

Figure 21.3.C.8 Oil cooler top view



- Position the lower cooler box baffle against the bottom of the oil cooler box and snugged to the cylinder. Make sure it lines up with the cylinder fins. Install the lower cooler box baffle using two bolts (AN3-4A) and washers (AN960-10L).

Figure 21.3.C.9 Detail view – baffle 3568-031

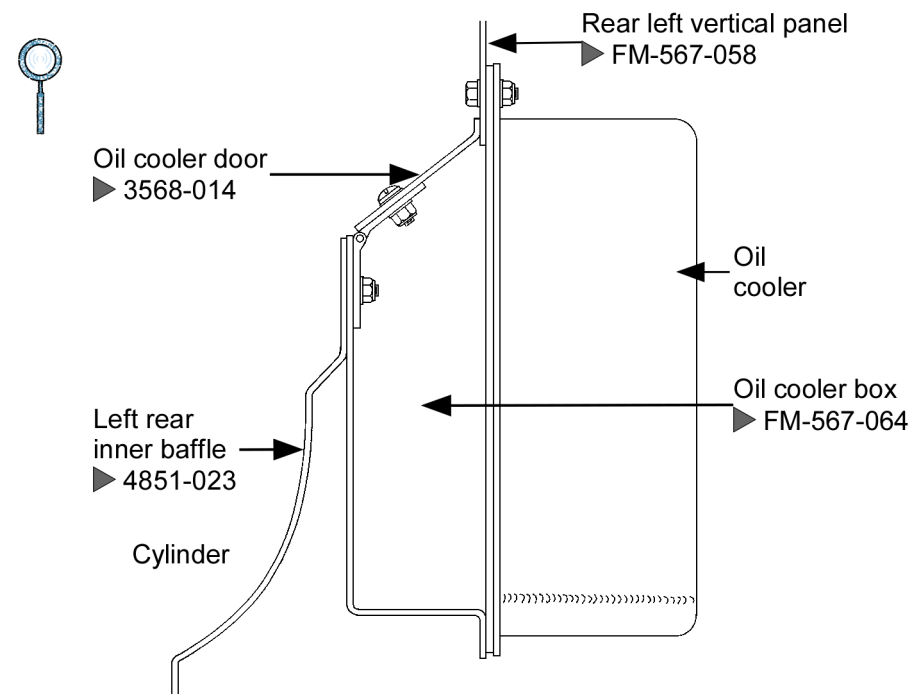




The second of these baffling pieces attaches to the forward surface of the oil cooler box. It is the left rear inner baffle (4851-023).

7. Next position the left rear inner baffle against the oil cooler box and snugly against the cylinder. Secure the left rear inner baffle using two bolts (AN3-4A) bolts and flat washers (AN960-10L).

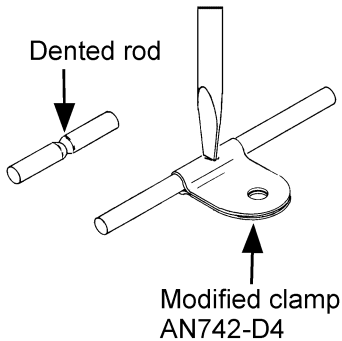
Figure 21.3.C.10 Detail view – baffle 4851-023



# **Finishing the Rear Vertical Baffling**

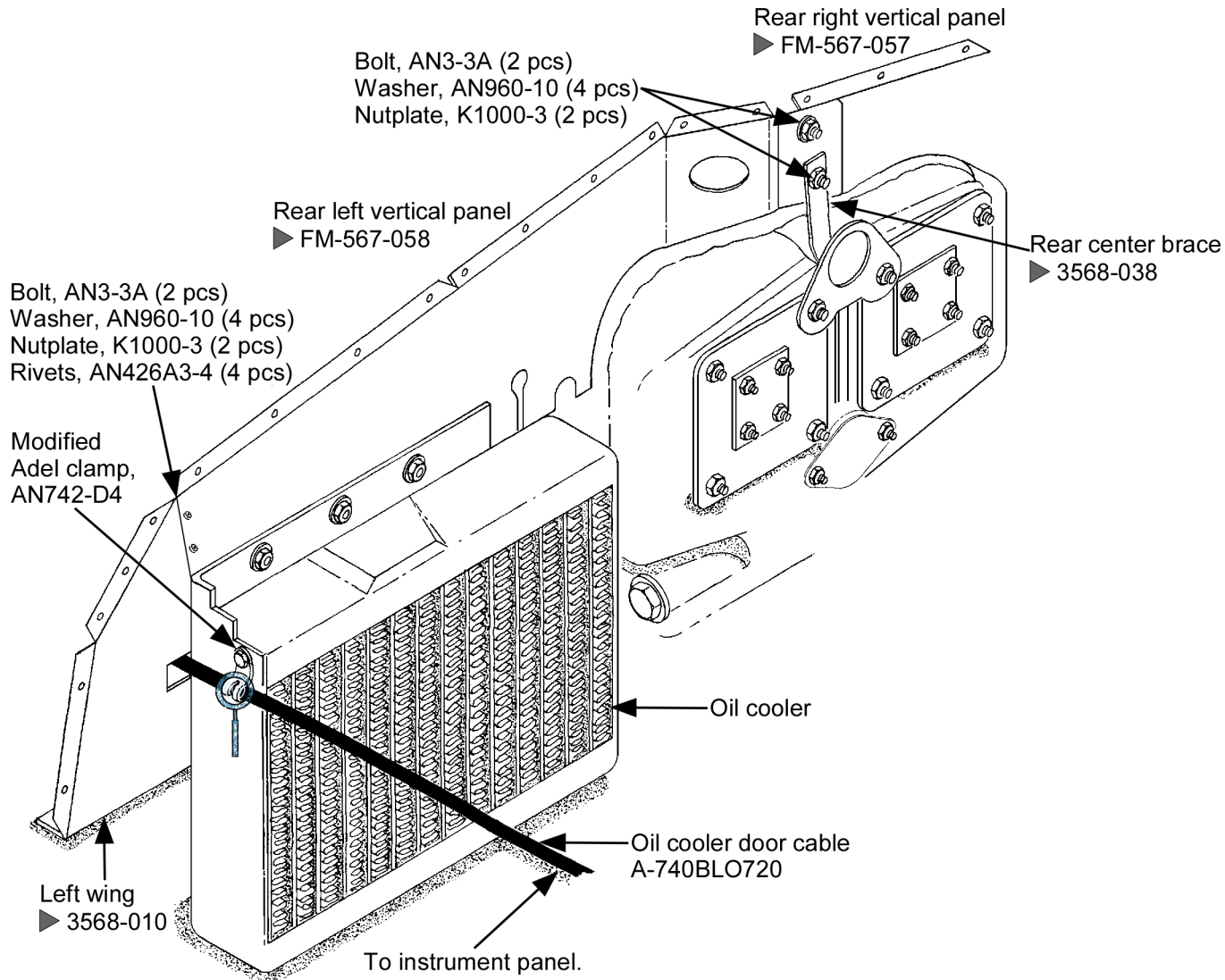
## **Steps...**

1. Position the rear right vertical panel (FM-567-057) with the outer baffle, at the bottom of the piece, fit snugly against cylinder 1.
2. Join the rear right vertical panel to the rear left vertical panel.  
The rear left vertical panel was installed on page 21.14 with the oil cooler box.
3. Install the left wing baffle (3568-010) by attaching it to the rear left vertical panel.
4. Using a chisel and hammer, dent the Adel clamp.



5. Attach the Adel clamp (AN742-D4) to the L (oil cooler) bracket (FM-567-063) installed on the oil cooler.
6. Slide the dented rod through the Adel clamp  
This keeps the cable stationary in the Adel clamp.
7. Thread the oil cooler door cable through the slot in the left wing baffle and through the dented rod.  
When this cable is fully installed it will run from the oil cooler door to the instrument panel.

Figure 21.3.C.11 Rear left vertical panel baffling



8. Position the right rear inner baffle (4851-018) so that it fits snugly against cylinder 1.
9. Secure the right rear inner baffle to the rear right vertical panel with two MS24693-S4 screws.
10. Install the rear center brace (3568-038) to the lower bolt that connects the right rear and left rear vertical baffles.  
The other end of the rear center brace rests against the inside of the lifting point. It does not need to be secured.
11. Install the right wing baffle (3568-011) to the rear right vertical panel.
12. Install the support bracket (3568-028, supplied with engine) to the case by installing a case bolt (3/8" x 1/2") with a lock nut.  
The other end of the bracket rests against the rear right vertical panel. It does not need to be secured.
13. Remove the outboard forward bolt of the starter. Install the support bracket (3568-029) to the starter by re-installing the bolt. (Use support bracket 567-038 for the lightweight starter.)  
The other end of the bracket rests against the rear right vertical panel. It does not need to be secured.

Figure 21.3.C.12 Right rear vertical panel baffling

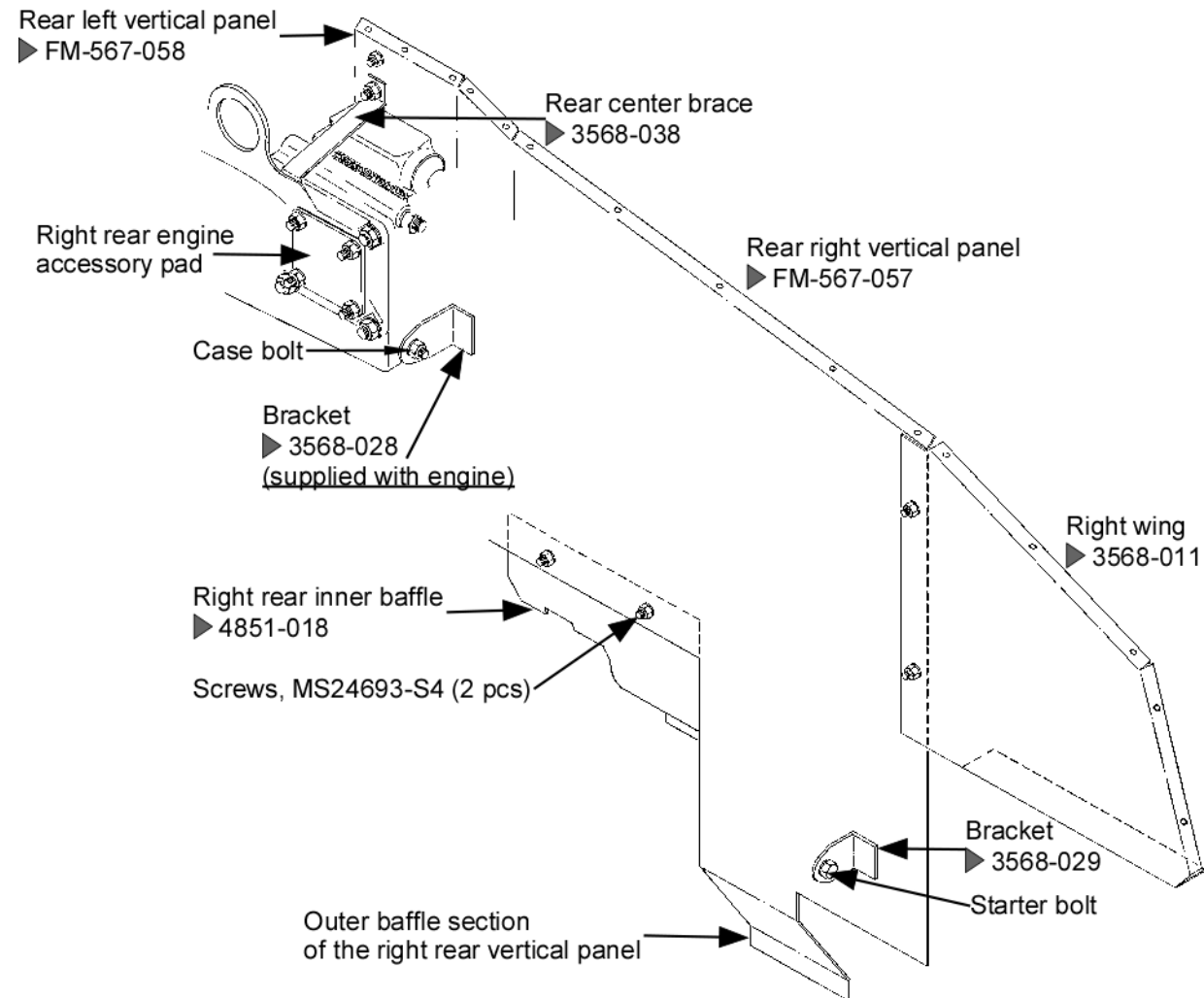




Figure 21.3.C.13 View of left rear baffling

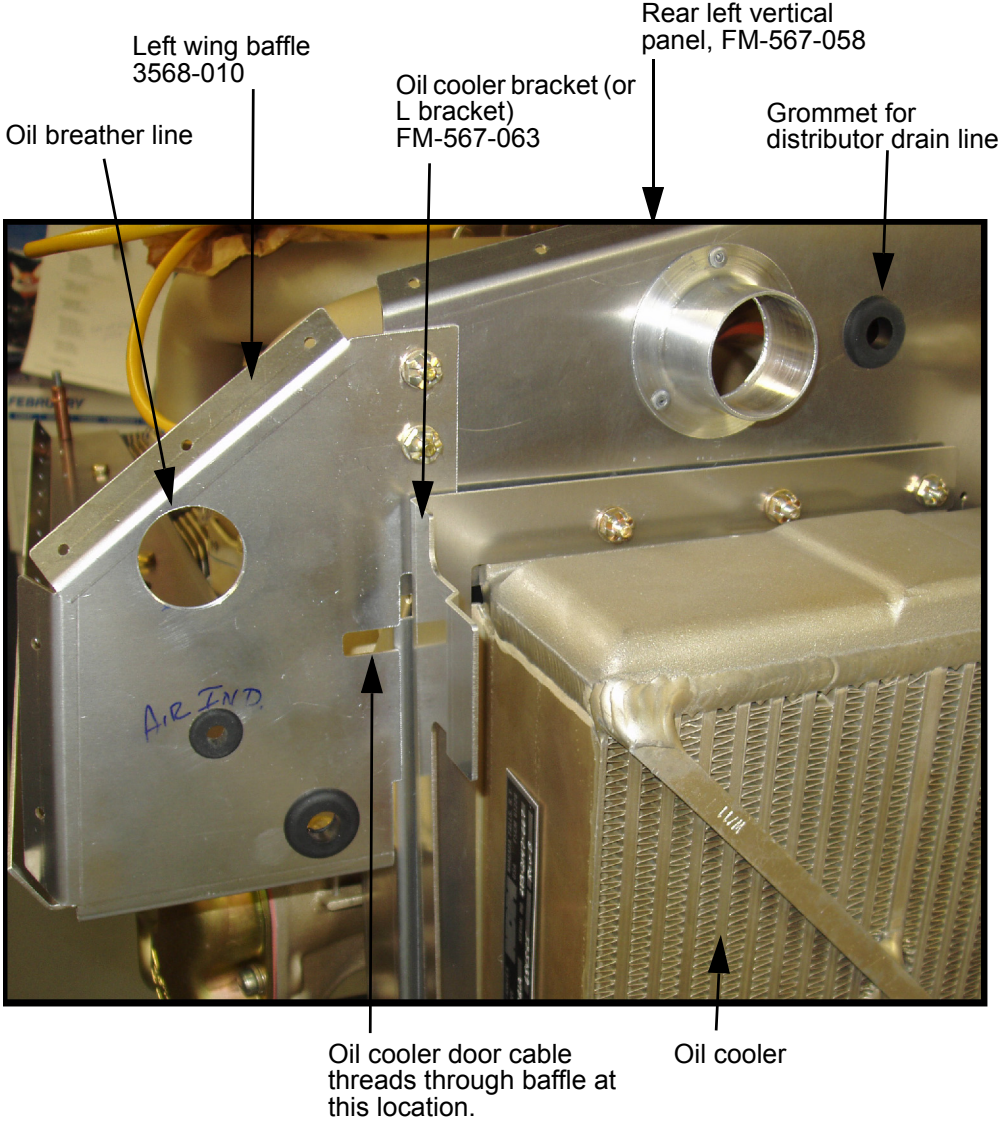
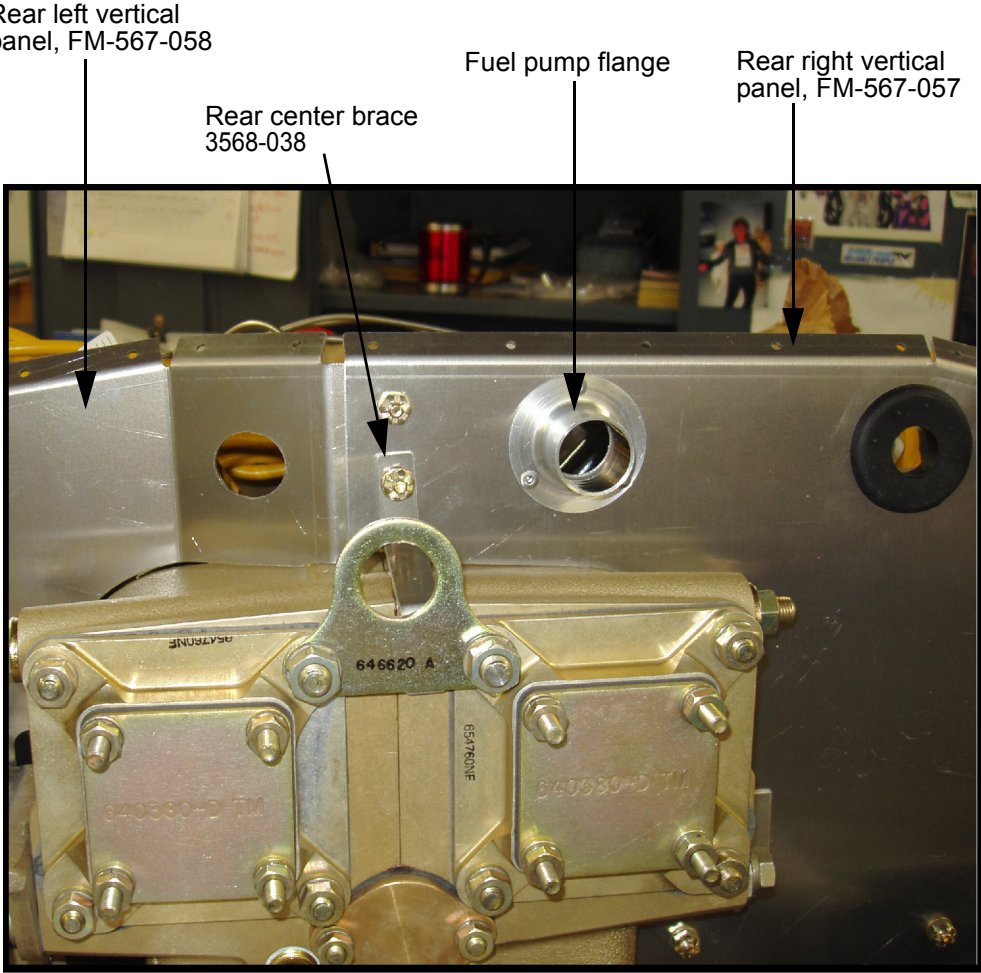


Figure 21.3.C.14 View of center and right rear baffling



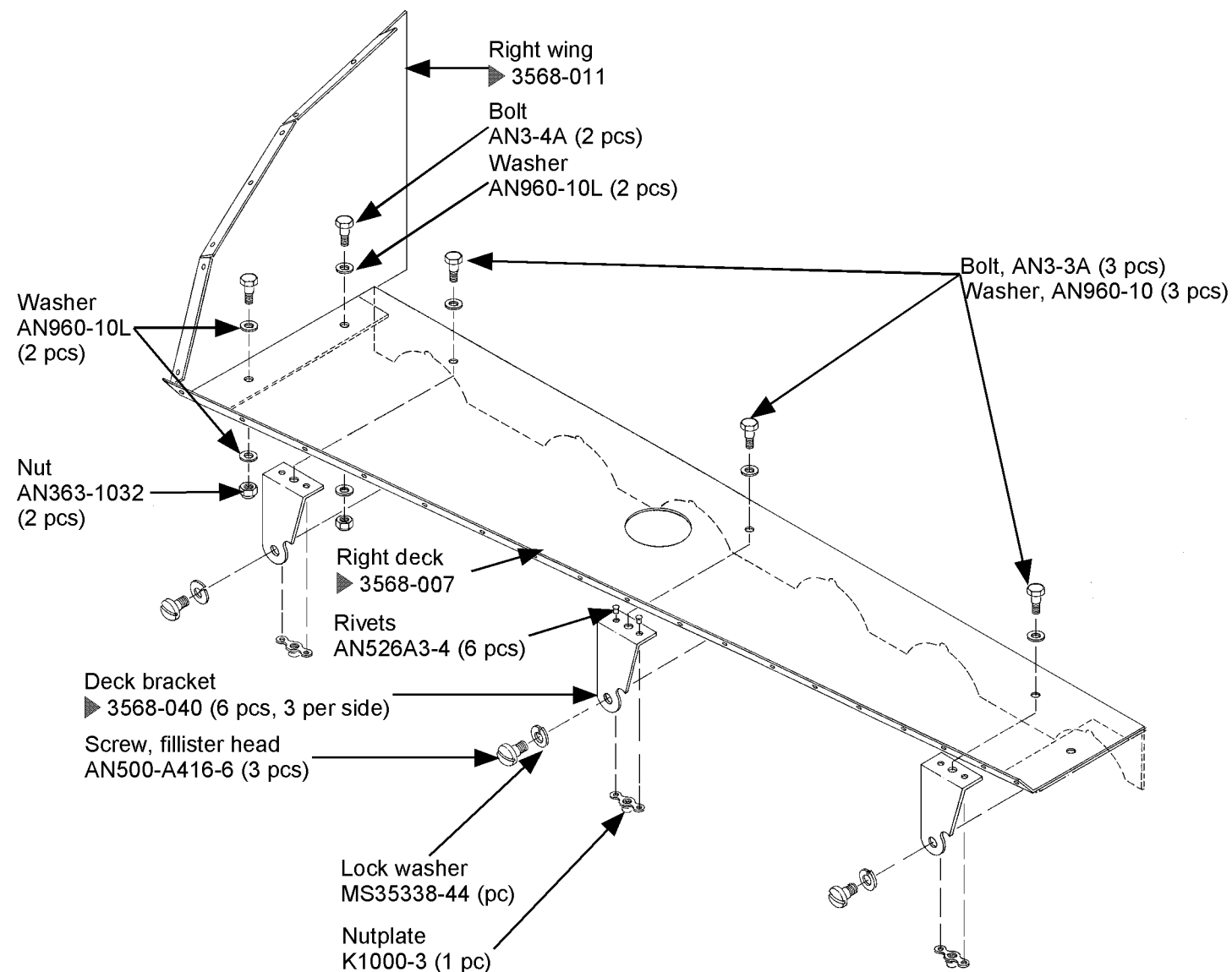
## Steps...

- Use three AN500-A416-6 screws and the MS3538-44 lockwashers.

**Tip:** These screw into the threaded hole located between the cylinder head valve covers. The hole in the head is shallow so do NOT use longer screws or bolts.

5. Attach the right deck to the three steel deck brackets. This completes the right deck baffling installation.

Figure 21.3.C.15 Right deck baffling



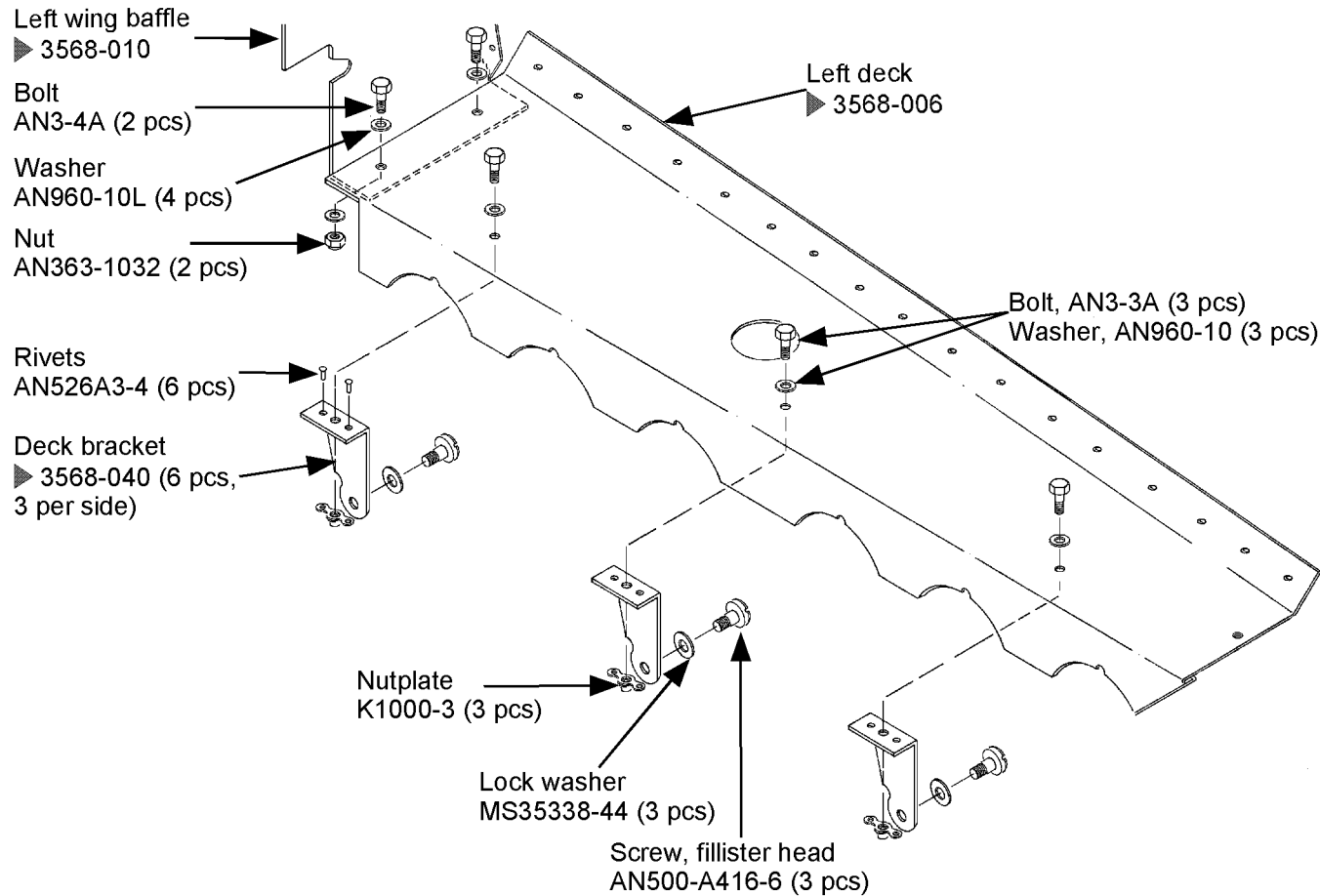
# Installing the Left Deck Baffling

## Steps...

1. Install the three remaining steel deck brackets (3568-040) by attaching one to each cylinder head on the left side.  
Use three AN500-A416-6 screws and the MS3538-44 lockwashers.  
**Tip:** These screw into the threaded hole located between the cylinder head valve covers. The hole in the head is shallow so do NOT use longer screws or bolts.
2. Mount the nutplates (K1000-3) using two rivets (AN526A3-4) per nutplate.
3. If necessary file the three steel deck brackets across their tops so they sit flat and are relatively level.  
Grinding may be necessary to align the deck brackets with each other since the castings can vary slightly.
4. Secure the left deck (3568-006) to the left wing (3568-010).
5. Attach the left deck to the three steel deck brackets.  
The left deck's outboard flange will need to be 1/4" to 1/2" (3 to 6 mm) from the inside of the cowlings when the cowling is installed.

This completes the left deck baffling installation.

Figure 21.3.C.16 -Left deck baffling





### Installing the Front Shroud Baffling

This section installs all four main pieces of the front shroud baffling and attaches it to the left and right decks.

#### Steps...

1. Clamp the upper and lower front shroud baffles together with enough over lap to drill holes through both pieces.
2. Position the upper front shroud baffle (3568-001) on the front of the engine and secure it using the bolts from the seal retainer.

If you need longer bolts, two 10/24 x .5" bolts are recommended. Check the thread pattern for a match.

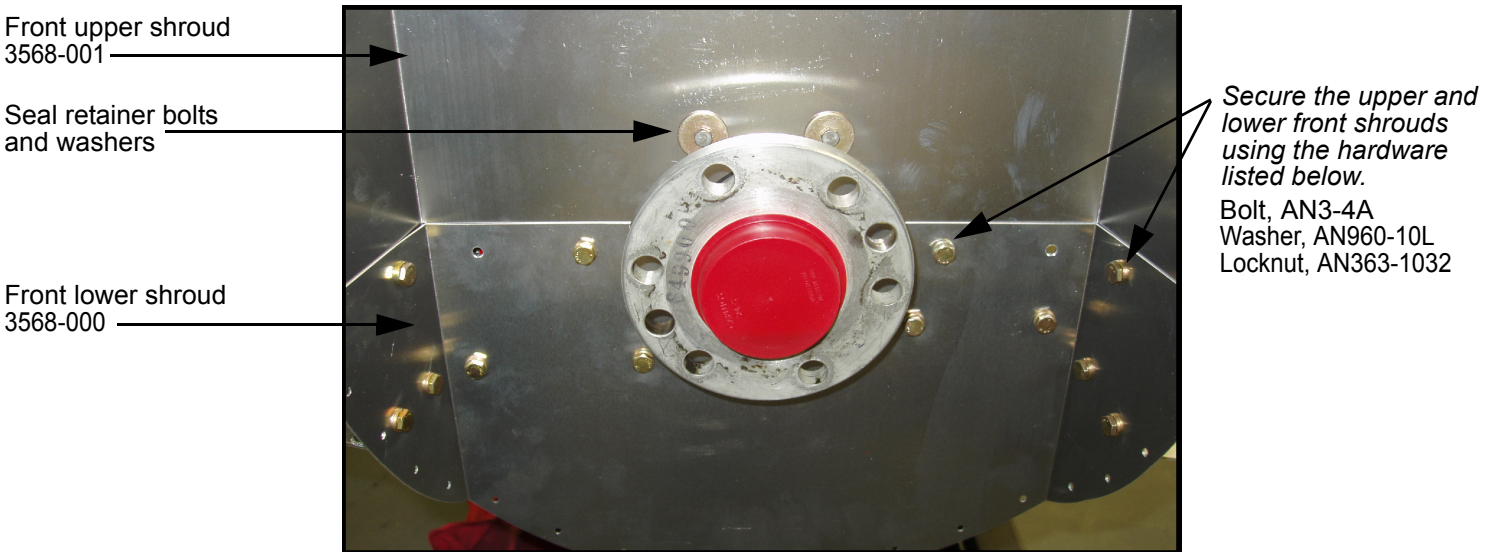
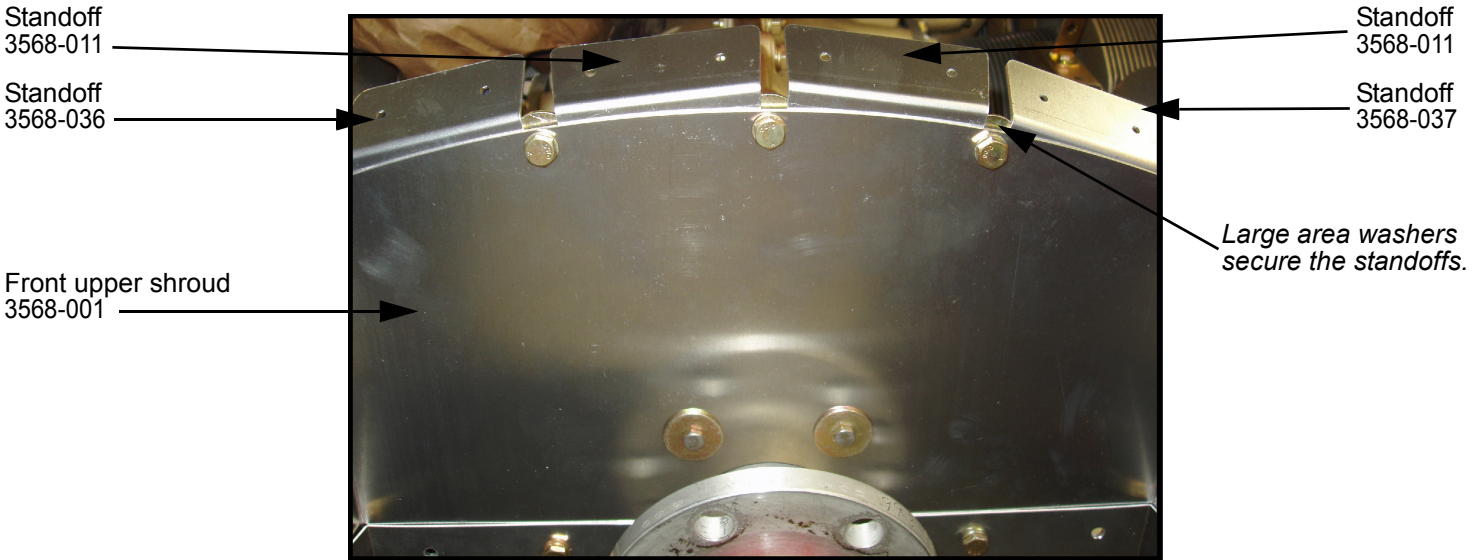
**Tip:** Before you drill the holes, check the clearance with the engine block.

Use AN960-10L washers underneath the heads. Use Loctite to secure the bolts.

3. Secure the lower front shroud (3568-000) to the upper piece using bolts. Make sure the two inner holes of the seal retainer are lined up with the holes in lower front shroud baffle piece.
4. Install the two center standoffs (3568-011) on the top edge of the upper front shroud. Use five bolts (AN3-4), ten thin washers (AN960-10L) and five nuts (AN363-1032).
5. Install the two remaining standoffs (3568-036 and 3568-037). Review Figure 21.3.C.17 for accurate placement of the standoffs.

Review this photo for the rear view of the washers and bolts for the standoffs.

Figure 21.3.C.17 Front baffles





6. Clamp the right front shroud (3568-003) and the left front shroud (3568-002) in place, attaching them to the front shrouds and the deck pieces that are already installed.
7. Secure the lower front shroud (3568-000) to the right front shroud's brackets using six bolts (AN3-3A) washers (AN960-10) and heat nuts (AN363-1032).
8. Secure the right deck (3568-007) to the right front shroud's brackets using bolt (AN3-4A) washers (AN960-10L) and heat nut (AN363-1032).
9. Repeat these last two steps for the left front shroud.
10. Attach the two brackets (4851-026 and 4851-027) to the right front shroud.
11. Attach the right front outer baffle (3568-030) to the right front shroud.
12. Attach the front right inner baffle (4851-024) to the right front shroud.
13. On the right front shroud, silicon the provided rubber patch to the seal around the alternator exhaust.


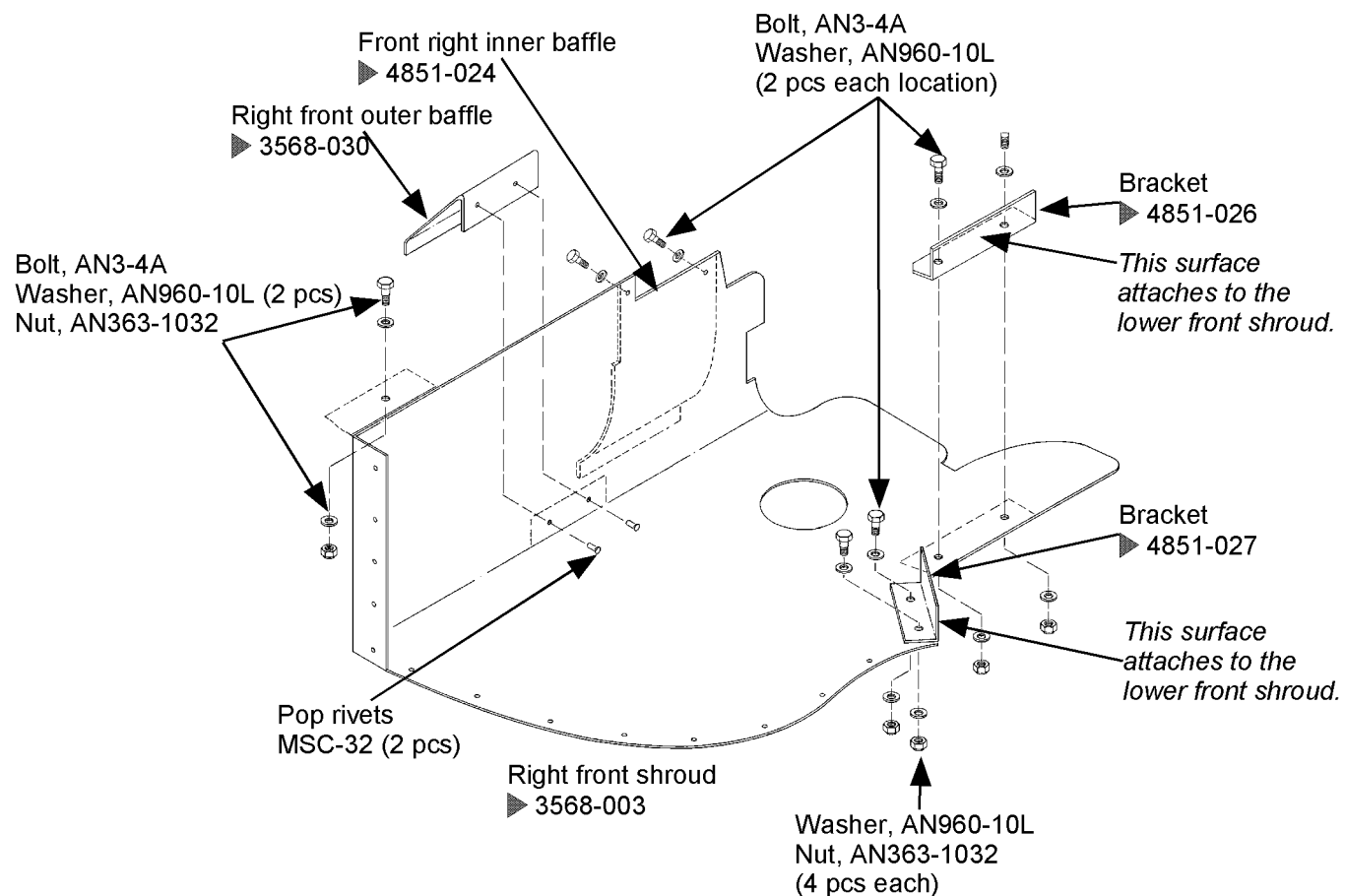
 Review this photo for the alternator exhaust seal.

Figure 21.3.C.18 Front right shroud



14. Attach the two brackets, 3568-023 and 4851-025 to the front left shroud (3568-002).
  15. Attach the front left inner baffle (4851-016) to the front left shroud using pop rivets.
  16. Attach the left front outer baffle (4851-035) to the front left shroud using pop rivets.
  17. Secure the front left shroud to the left deck (3568-006).
- Tip:** The baffling pieces 4851-016 and 4851-035 that are attached to the front left shroud should fit snugly against the cylinder.
- This completes the front, the front left and the front right shroud installation.

Figure 21.3.C.19 Front left shroud

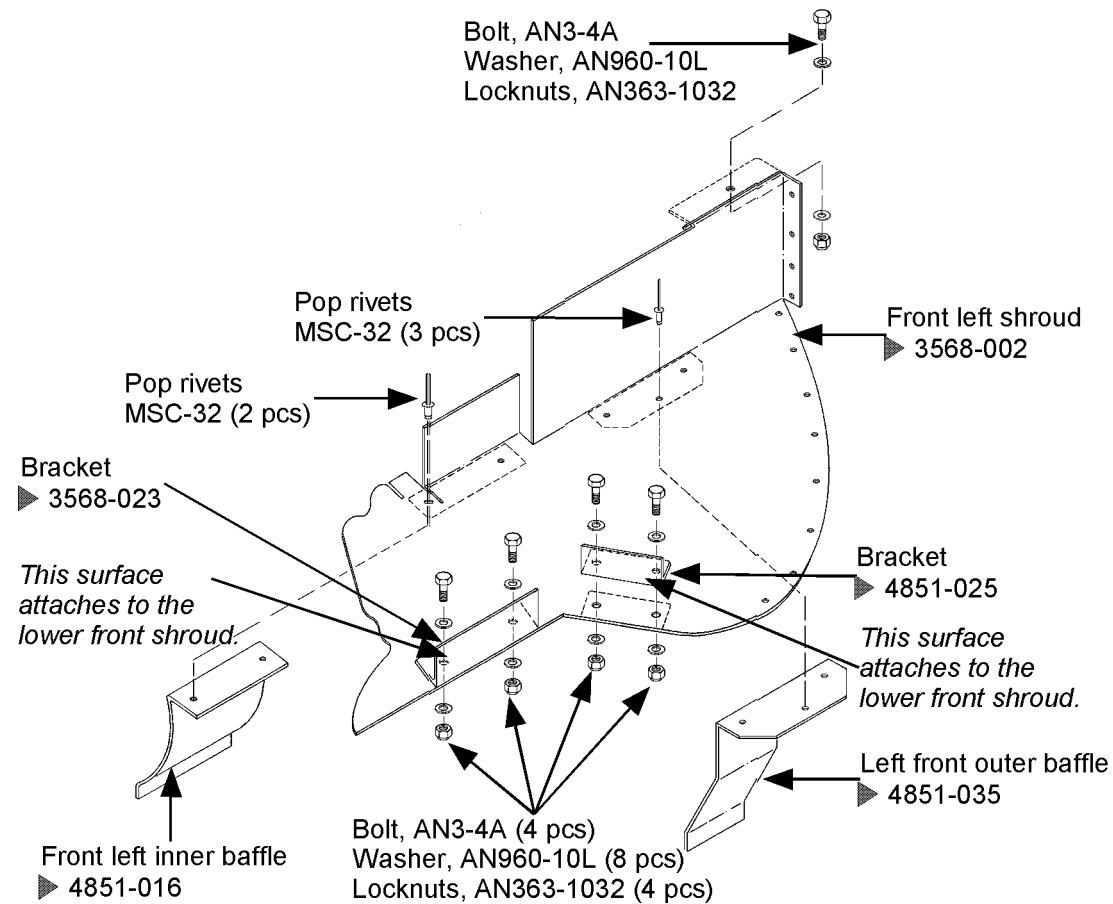
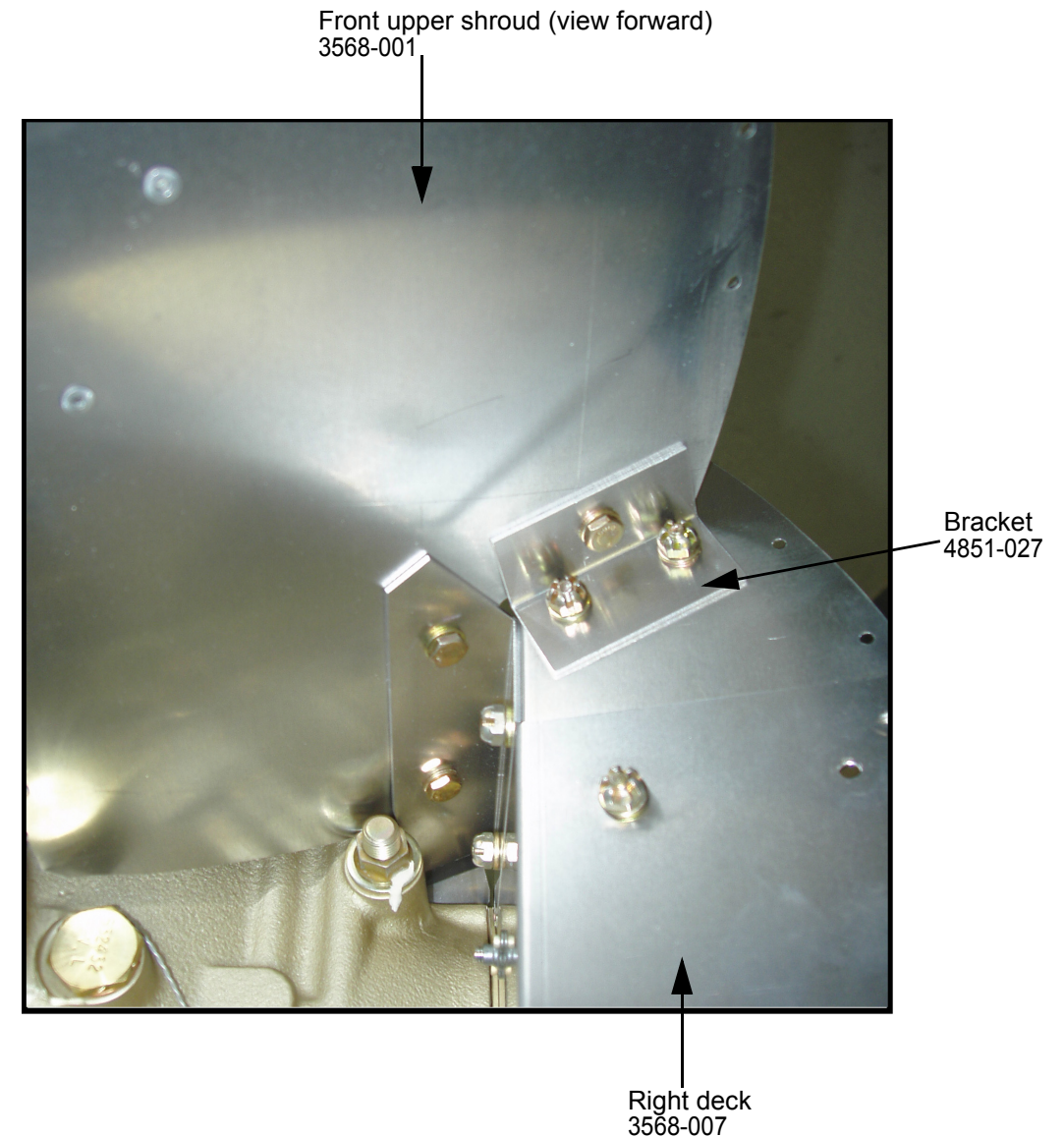


Figure 21.3.C.20



## Installing the Baffling Seal

The flexible baffling seal roll is a soft, silicone based material that is included with the baffling kit.

### Steps...

1. Using the baffling seal template cut the 34 baffling seal pieces from the roll (3568-A).

*Note:* If the baffling seal template was not included with your kit, you need to obtain the template prior to cutting these pieces.

2. Install the baffling seal pieces from the inboard side of the aluminum baffle panels.

The baffling seal pieces must lay inward against the cowl top to form a good seal that tightens when pressurized with ram air. If a flexible baffle were to get blown back, a massive air leak would result and the engine could easily overheat.

3. Pop rivet each piece in place using the wide-head pop rivets (BSL42) and any washer that fits.

Place a pop rivet approximately every 1-1/2" to the entire perimeter of the pressure cowl area.

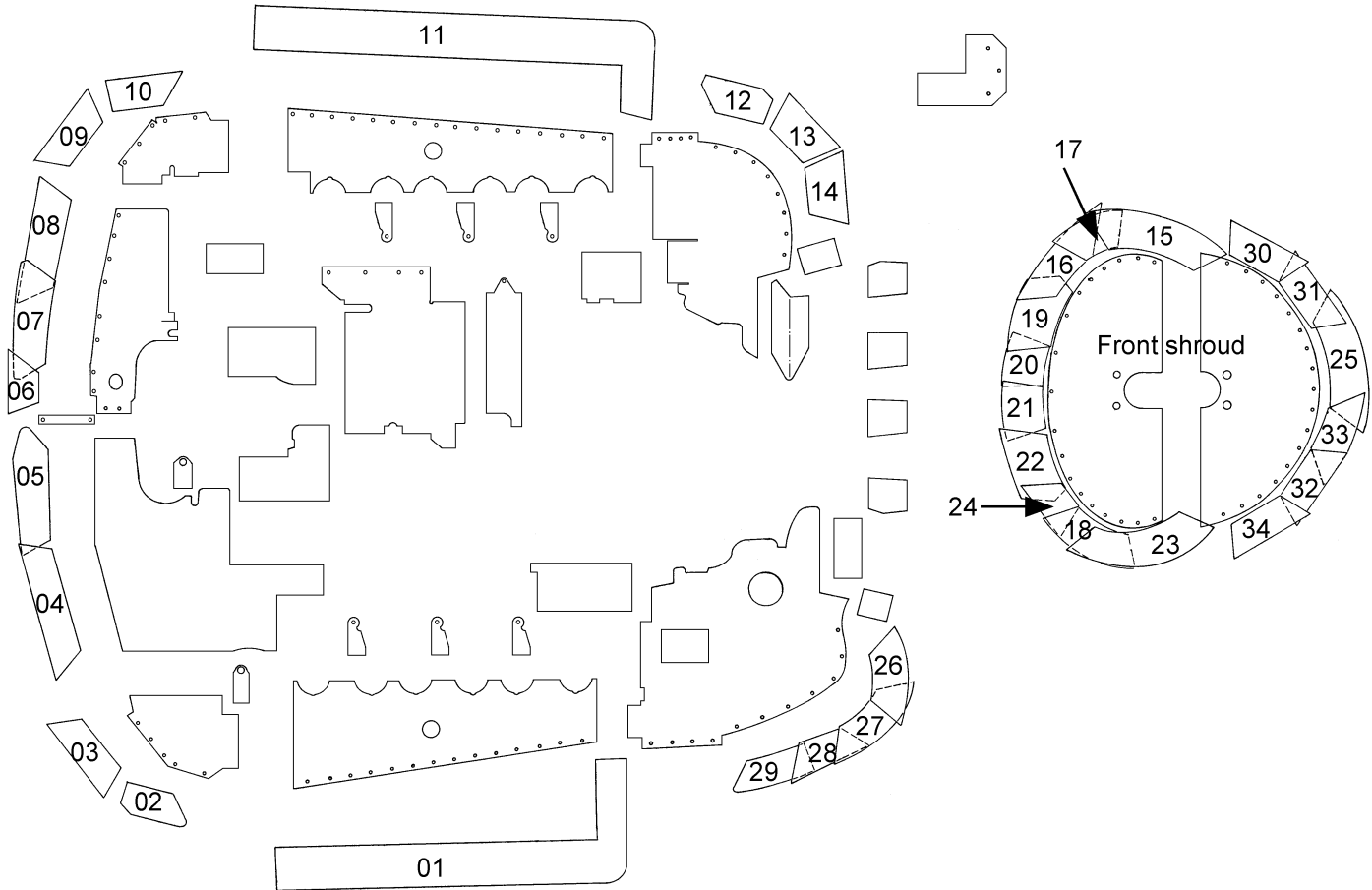
You'll find that once you've installed all the flexible seals, the top cowl will seem particularly difficult to get installed into proper position.

As the engine heat works on these seals, the fit will improve. After a few hours of running time the cowl will not be a problem to install.



Review this photo for an example of the baffling seal installation.

Figure 21.3.C.21 Baffling seal kit top, flat view and positioned around the baffling pieces



## Installing Flanges and Grommets on the Right Rear Panel

This section locates the flanges and hose openings right rear vertical panel.

- Fuel pump flange, (561-1)
- Gascolator flange, (561-1)
- Vacuum pump shroud (optional) (1058)

### Steps...

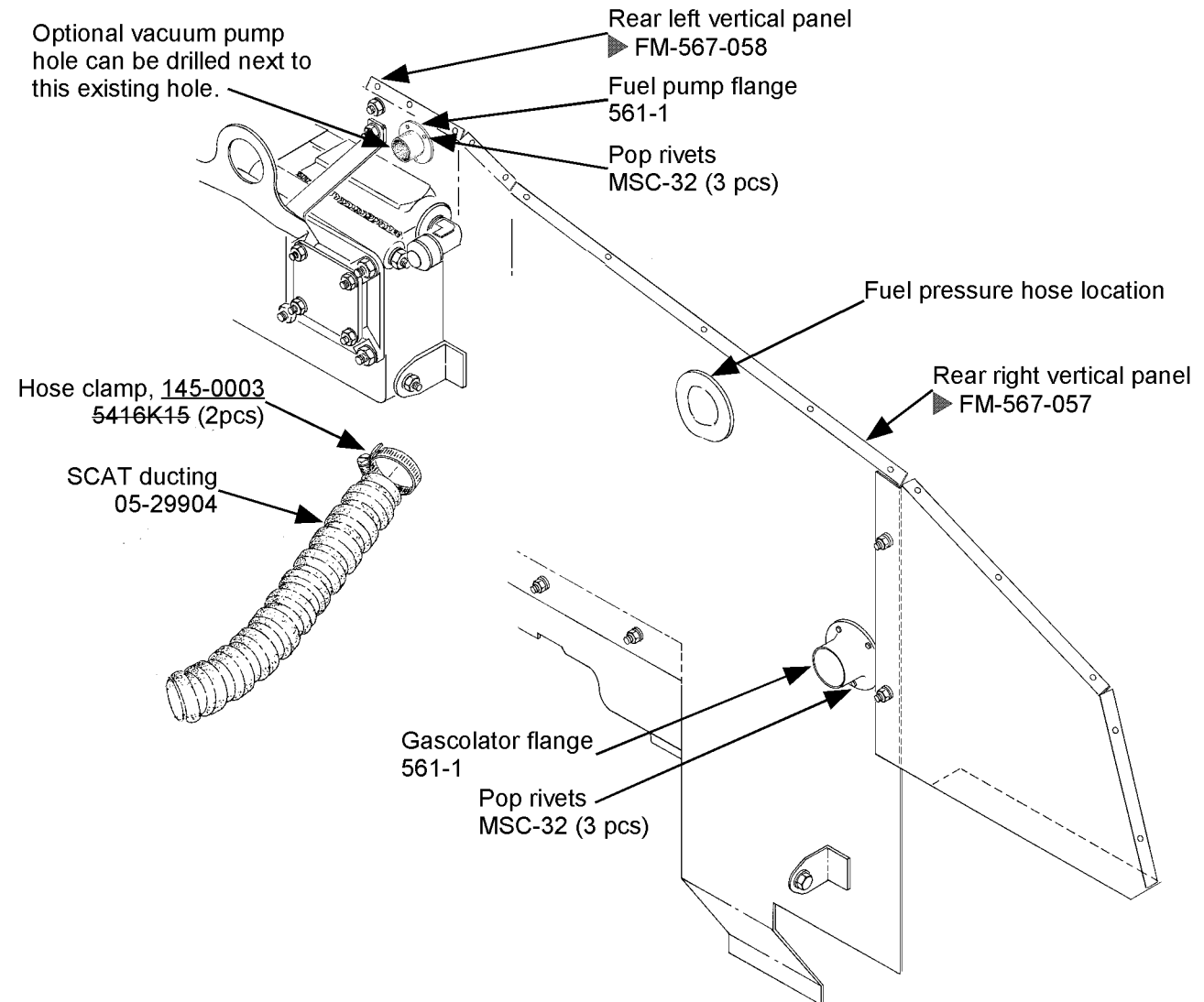
1. Drill three holes in each flange.  
These are the holes used to rivet the flange to the rear right vertical panel.
2. Hold each flange against a hole in the rear right vertical panel. Mark each hole location on the panel.
3. Drill the holes you marked in the previous step in the rear right vertical panel.
4. Secure each flange with three pop rivets (MSC-32) and washers.

### Optional step:

5. If you are installing the optional vacuum pump, you will need an additional hole in the rear right vertical panel. Locate the opening as shown in Figure 21.3.C.22.

🎯 Review this photo for the rear right vertical panel's flanges and rubber seals.

Figure 21.3.C.22 Flange locations on the right rear panel



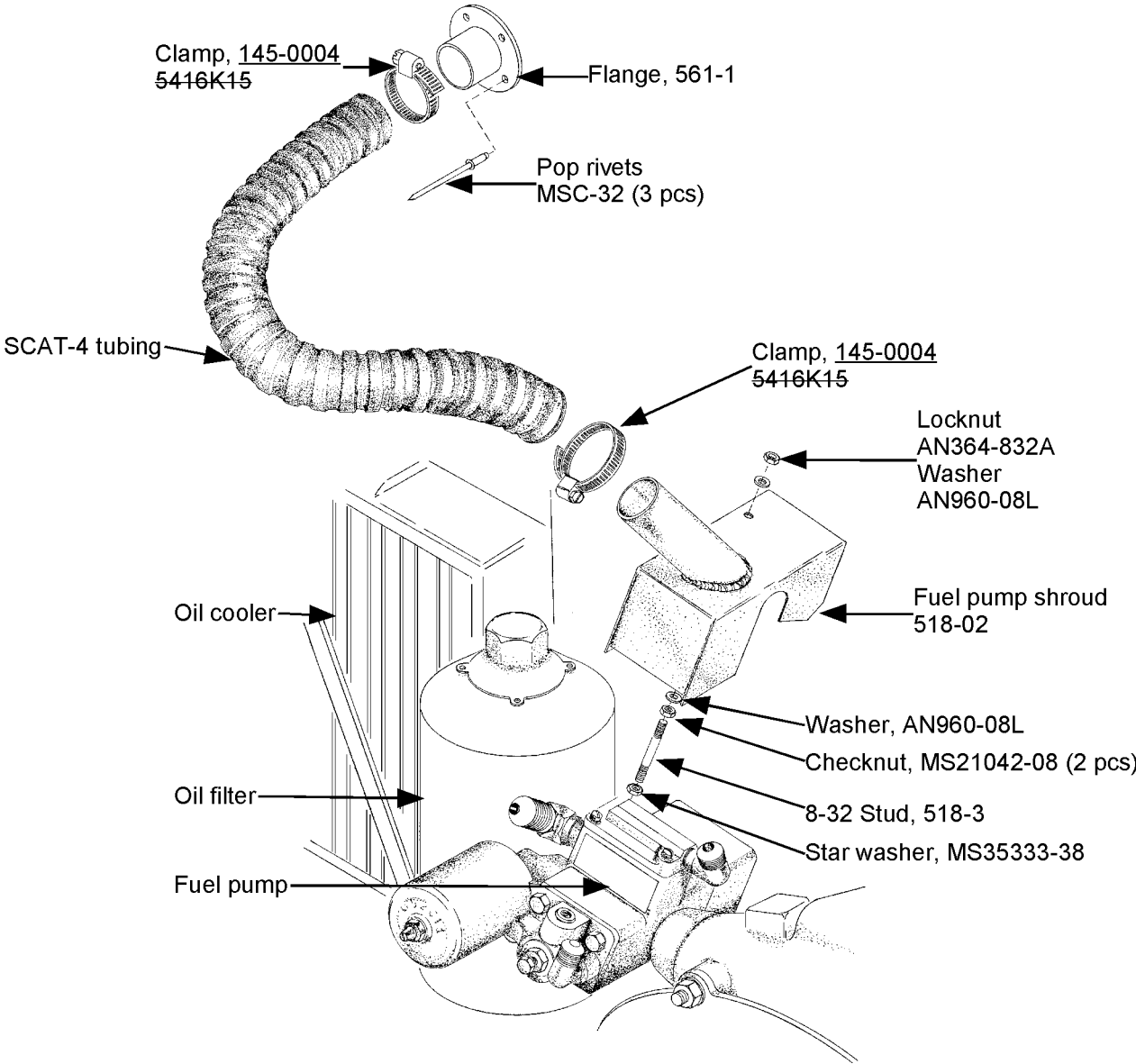
# Installing the Fuel Pump Shroud

## Steps...

1. Install the 8-32 stud (518-3) on the fuel pump.
2. Install the fuel pump shroud (518-02) using the locknut and washer.
3. Now attach the SCAT-4 tubing using the clamp.  
This line is a 1" diameter SCAT tube which originates at the rear right vertical panel (FM-567-057) and extends back to the fuel pump shroud.  
See Figure 21.3.C.22 for the flange location on the right rear panel.
4. Assemble the flange to the SCAT tubing on the end away from the fuel pump shroud.

Review this photo for an example of the fuel pump shroud and SCAT tubing installation.

Figure 21.3.C.23 Fuel pump shroud





### 21.3.D Completing the Engine's Primary Control Systems

The following views of the Continental IO-550N engine acquaints you with the locations of the significant control systems. Several items are standard such as the throttle, prop and mixture. Other items may vary based on your chosen equipment, for example the type of fuel pressure gauge, manifold pressure gauge, and the oil temperature and pressure.

#### View of the Engine Control Systems

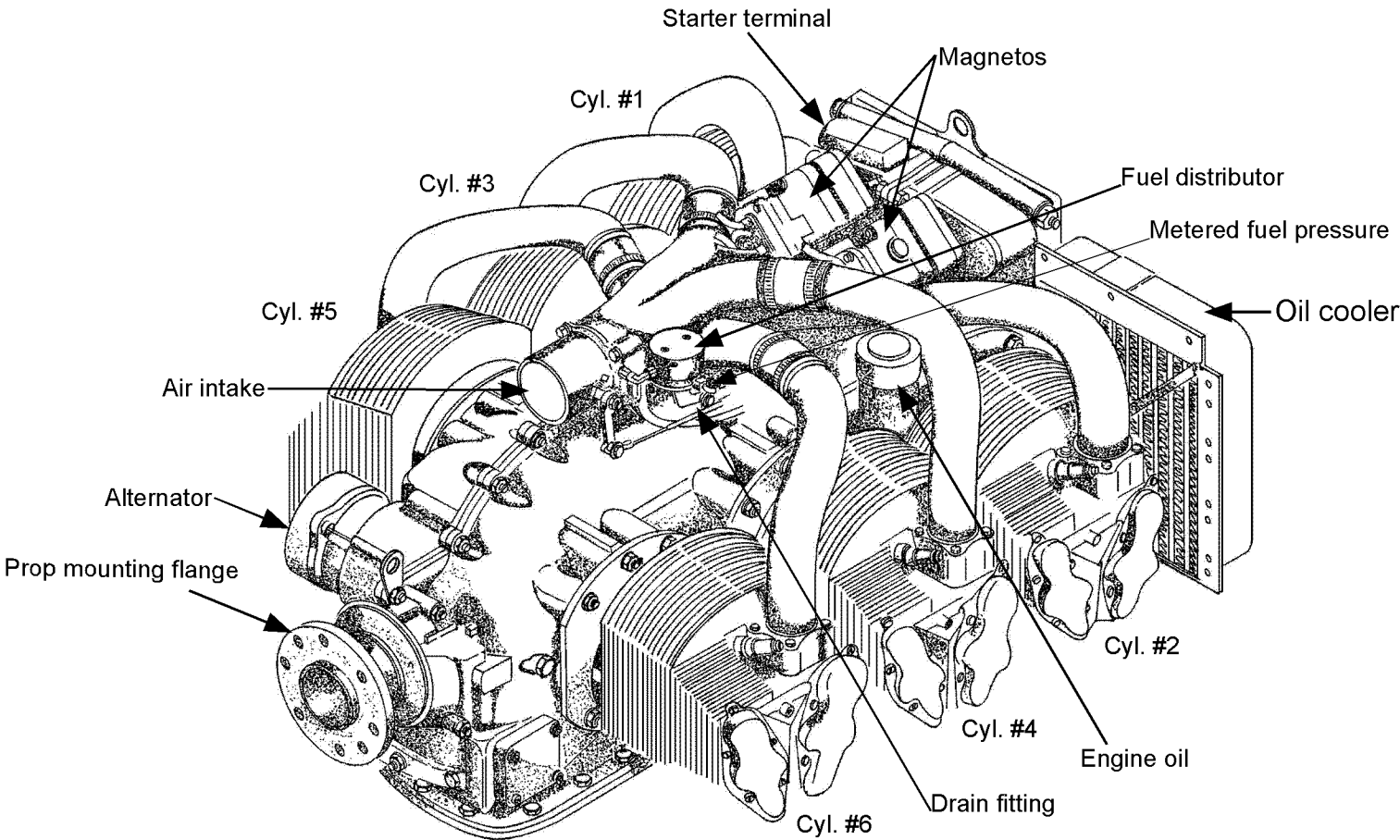
The top view is displayed at the right in Figure 21.3.D.1. The following engine control systems are installed in this section:

- throttle cable
- mixture control cable
- prop governor cable
- manifold pressure
- idle mixture
- optional vacuum pump mount

⊙ Continental IO-550N front view.

⊙ Continental IO-550N rear view.

Figure 21.3.D.1 Continental IO-550N top view



# Installing the Throttle Cable and Bracket

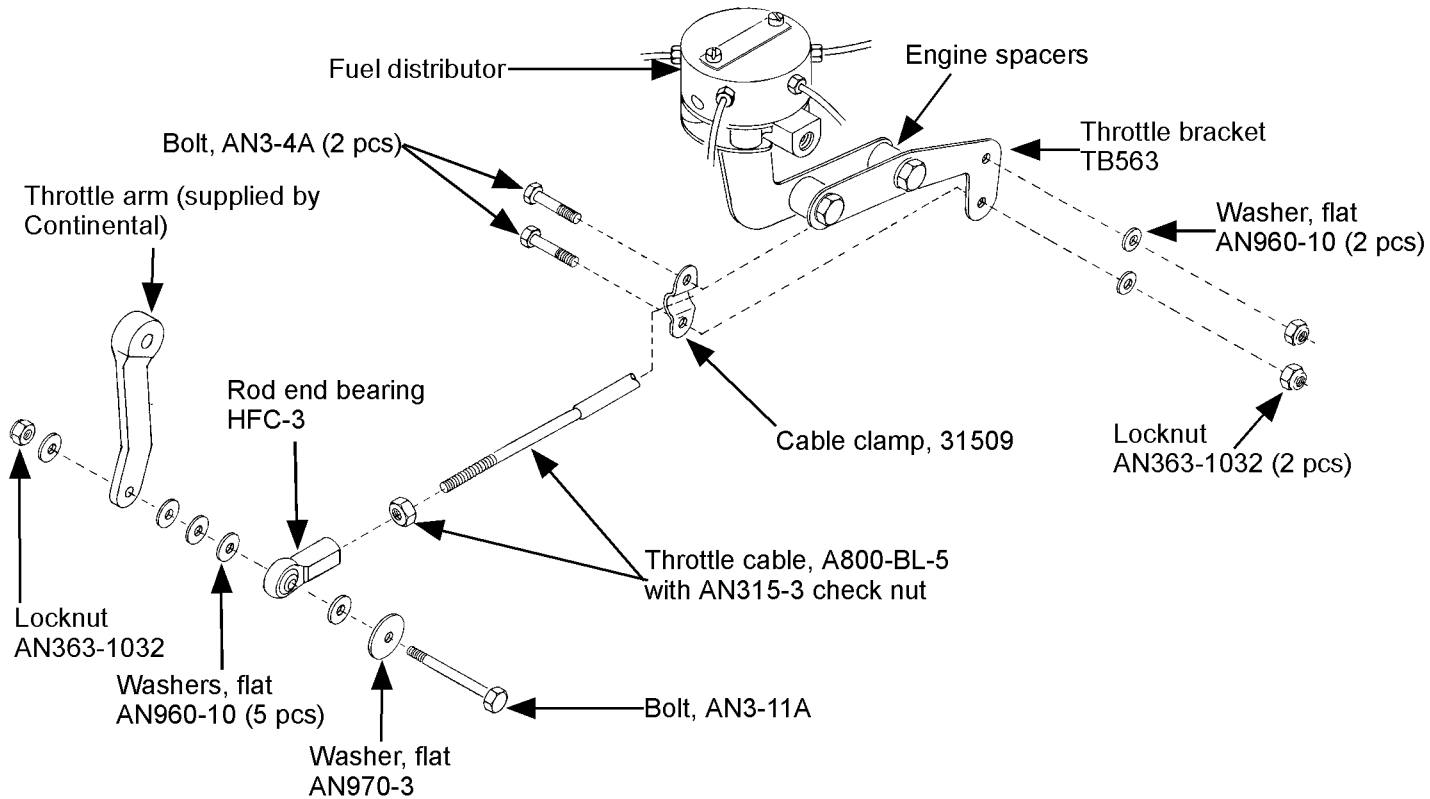
## Steps...

1. Route the throttle cable through the firewall.  
**Tip:** See the firewall blueprint [A3586](#), pages 1 and 2, for the location.
2. Next route the throttle cable through the rear left vertical panel (FM-567-058) between the oil cooler and the engine case.
3. Review this photo for the location of the throttle cable through the left rear baffle.
3. Assemble the throttle arm.  
**Tip:** The throttle cable needs to be aligned with the throttle arm. Verify the installation location of the throttle bracket (TB563) on the engine.
4. Torque the throttle arm to 120 in-lbs.
5. Attach the throttle bracket on the engine.  
The engine spacers must be positioned between the brackets as shown in Figure 21.3.D.2.
6. Attach a control cables clamp (31509) on the inside of the throttle bracket.
7. Thread the cable through the clamp and adjust as necessary.
8. Connect the throttle cable with the tapered edge toward the indexing groves.  
**Tip:** When the throttle cable is tightened down, it creates its own indexing groves. Make sure it is in the correct location prior to tightening.

Review this photo for a throttle arm detail view.

Review this photo for a throttle bracket detail view.

Figure 21.3.D.2 Throttle cable and bracket





## Installing the Mixture Control Cable and Bracket

### Steps...

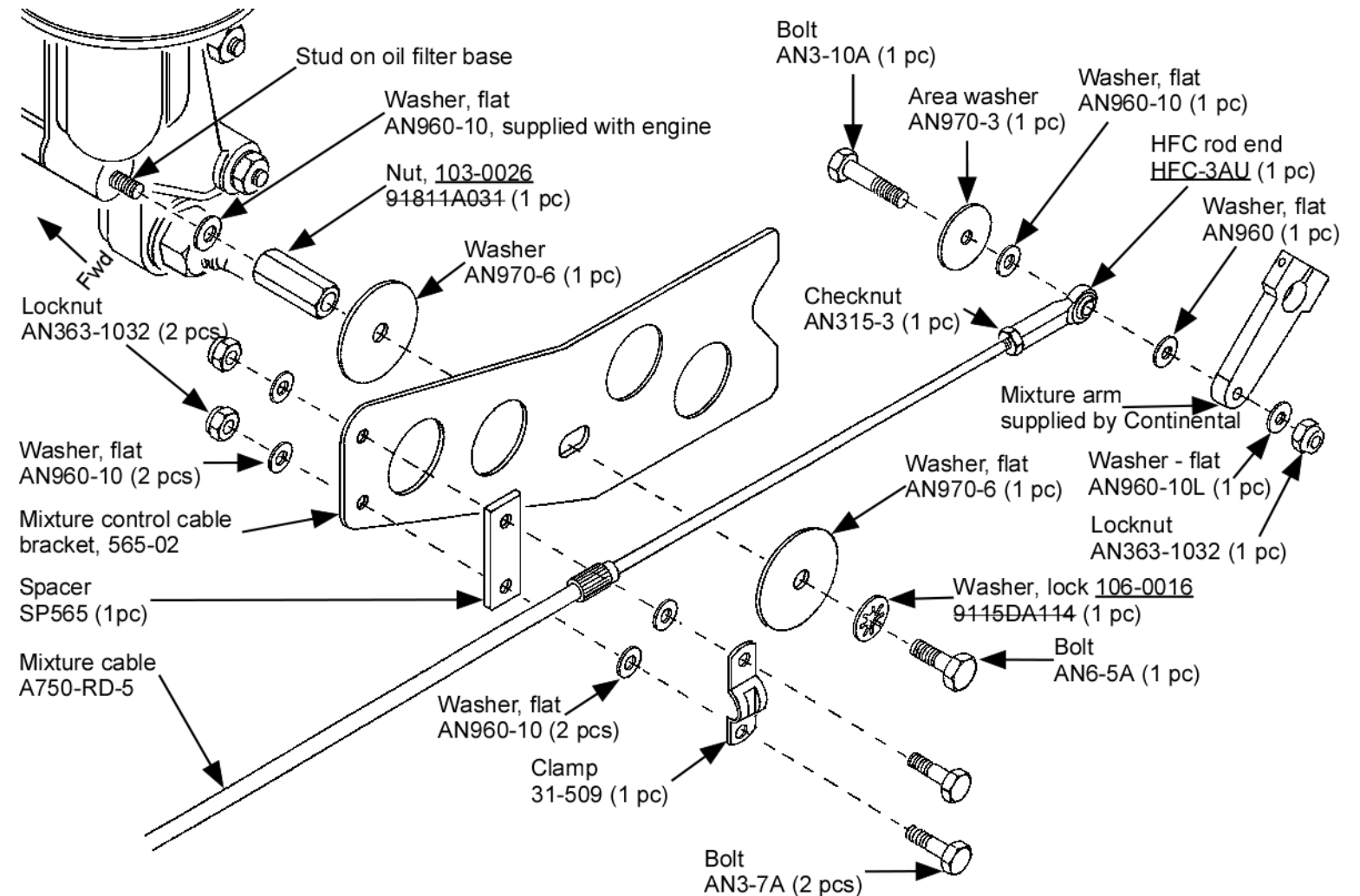
1. Mount the nut 91811A031 103-0026 to the stud on the oil filter base casting. Torque to 9 ft. lbs.  
**Tip:** Use Loctite 242 (blue) to install the nut.
2. The inboard end of the 565-02 bracket will fit to the contour of the engine casting. This keeps the bracket firmly in place.
3. Assemble the mixture control cable (A750-RD-5) and clamp it to the bracket temporarily.
4. Work the mixture cable from lean to rich and adjust it as necessary to get the proper travel.
5. Now adjust the bearing rod end and tighten the check nut as necessary.

**Tip:** It is very important that the mixture control cable bracket stays put. You don't want it to come loose at any time for any reason.

☉ Review this photo for a side view of the mixture control bracket mounted to the stud.

☉ Review this photo of an installed mixture control bracket.

Figure 21.3.D.3 Mixture control cable and bracket



## Installing the Prop Governor Cable

This cable goes under the baffling.

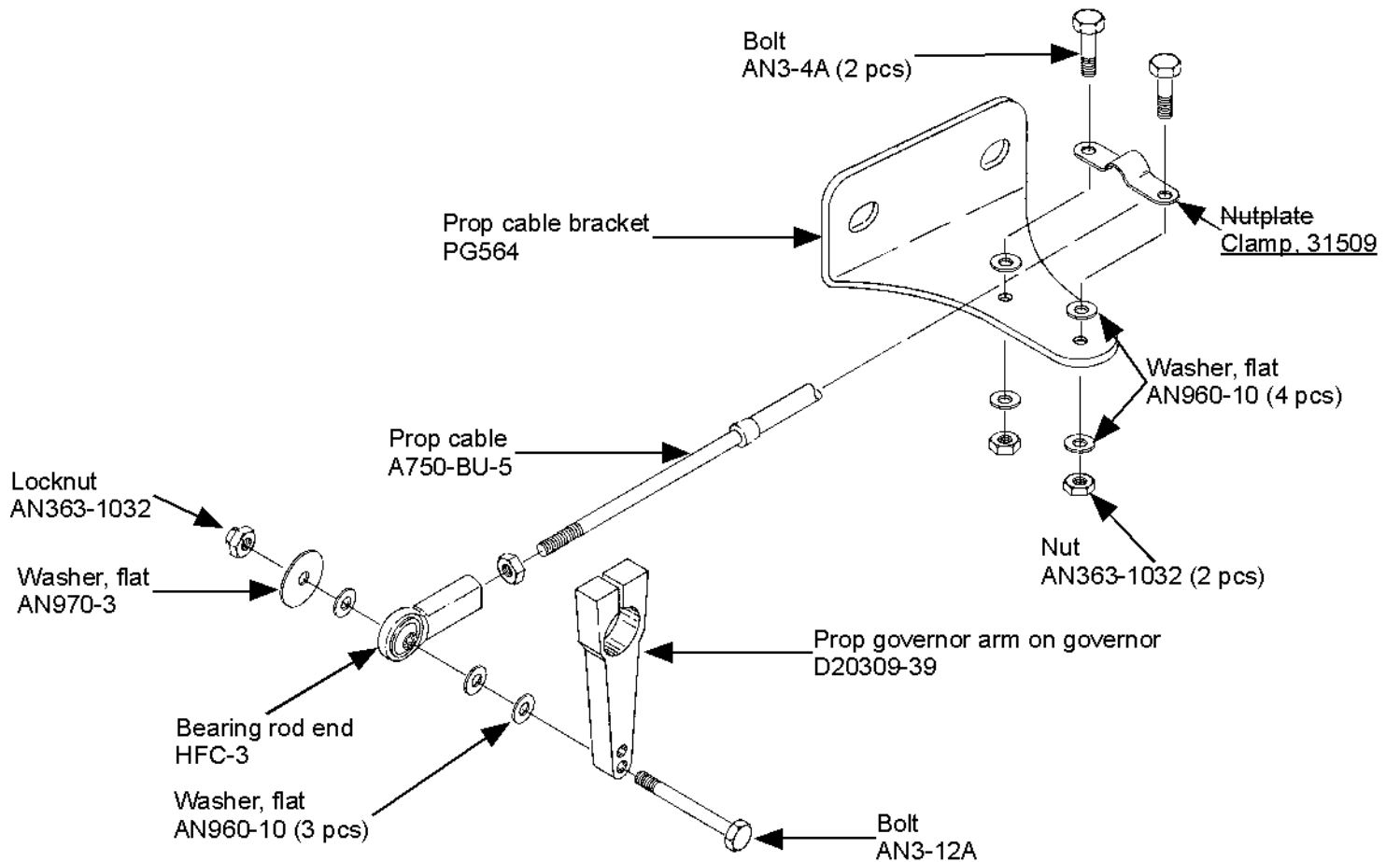
### Steps...

1. Remove the two front left lower engine foot bolts.
2. Install the prop cable bracket (PG564) all the way aft, mounted on the two bolts.
3. Torque the foot bolts to 20 ft.-lbs.
4. Assemble the prop governor cable and clamp it to the prop cable bracket using the cable clamp (31509).

**Tip:** It is typical to shorten the cable by 1/4" by adjusting from stop-to-stop using a threaded cable or an adjustable bracket with slotted holes.

🎯 Review this photo of the prop governor cable installation.

Figure 21.3.D.4 Prop governor cable



### 21.3.E Connecting the Manifold Pressure

The manifold pressure is picked up on the left side of the engine, just aft of the throttle arm. The final installation of the manifold pressure depends on which type of gauge you select.

#### Steps...

1. Install a C5405x4x4 to the manifold pressure pickup.  
This is a 45° flair fitting.
2. Attach a 1/4" (6 mm) flex line to the fitting installed in the previous step.

From this point the line can be routed one of two ways:

- It is routed aft to an electronic sender,
- or –
- It is routed through the aft baffling to a sender behind the pressure cowl area or through the firewall to the gauge.

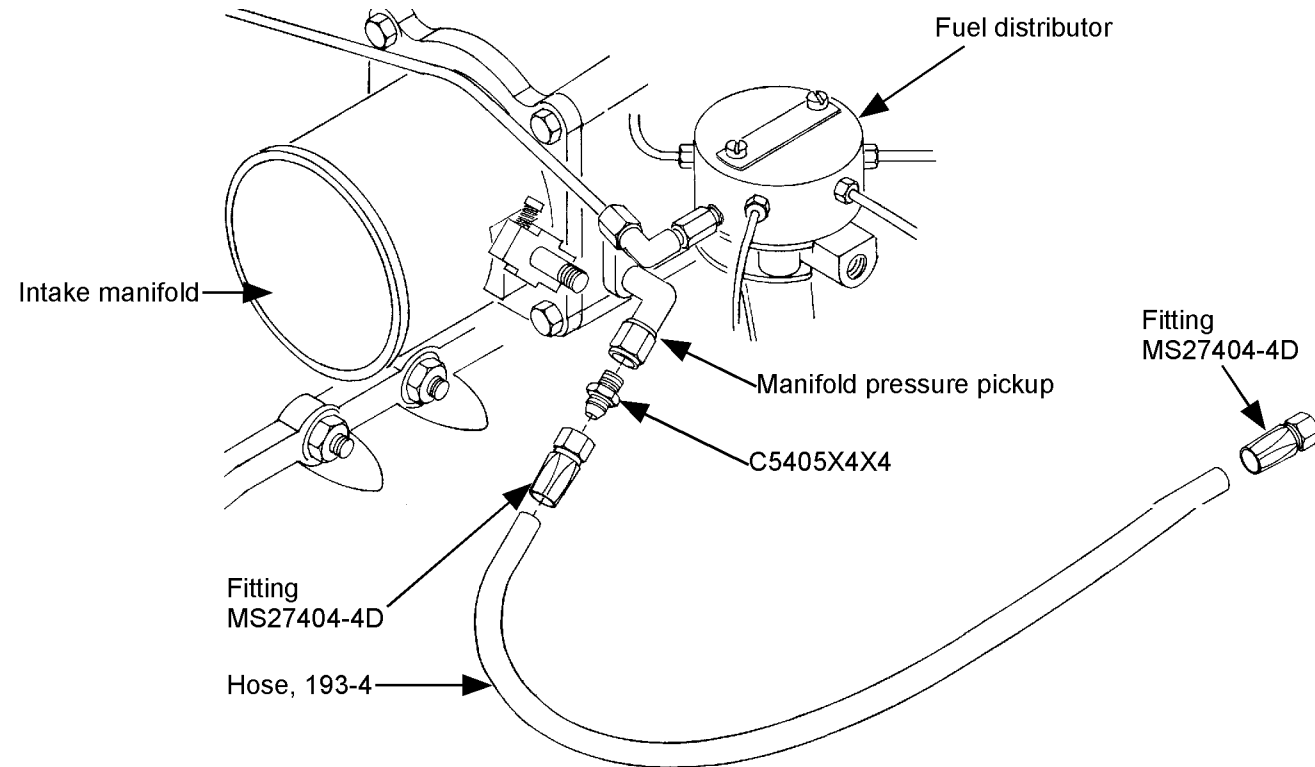
If the second approach is selected, a firewall bulkhead fitting (AN832-4D) needs to be used. Generally Fireshield is not used on this line. Typically the line is then routed through the rear left vertical panel baffle piece using a MS35489-13 grommet.

If you are using the VMS 1000 system, secure it using the AN3-4A bolts, AN936-A10, and the AN960-10 washers provided in the hose kit.

Make sure the hose is well secured to protect it from chaffing or rubbing.

📷 Review this photo of the manifold pressure pickup.

Figure 21.3.E.1 Connecting the manifold pressure





### 21.3.F Completing the Fuel System

The fuel system has already been installed up to and through the firewall with the bulkhead fitting. A gascolator is attached forward of this fitting as a last catch for large particulates and water. This section covers the installation of the fuel supply and return lines as well as drain lines.

#### Using Fireshield

All fuel supply lines must be wrapped in fireshield. This not only protects against fire, but it also helps insulate and keep the fuel temperatures lower. The fireshield must be sealed at each end using a hose clamp or safety wire.

#### Installing the Gascolator

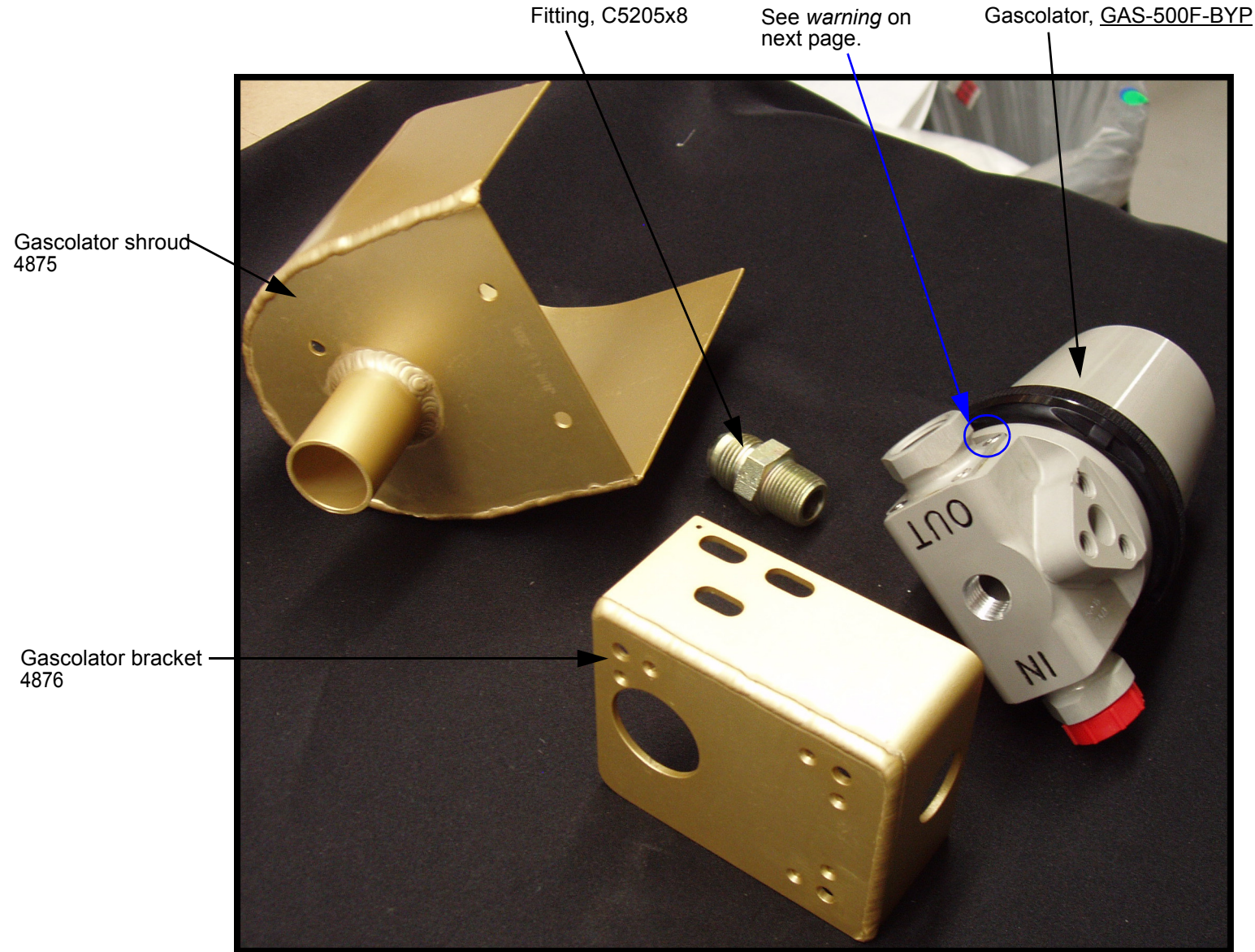
This Lancair gascolator (GAS-500F-BYP) is a high pressure type compatible with the fuel system. The gascolator has a built-in filter and all the fittings are included with the kit. The blast tube is in the hose kit.

**Tip:** Refer to the blueprint A-504 supplied with the gascolator for specific part numbers.

#### Steps...

1. Cut a 2" (50 mm) dia. hole in the firewall's aft laminate and core at the location shown in Figure 21.2.0.1 on page 21.7.
2. Sand and clean the circular cutout area and the surrounding laminate in preparation for BID.
3. Form a radius around the exposed core of the circular cutout with a thick epoxy/micro mixture.
4. Reinforce the area with a 4-BID, overlapping onto the original aft laminate 1" (25 mm) around the cutout perimeter.
5. Drill a 7/8" (21 mm) hole through the firewall, centered on the coreless area you just made.
6. Install the gascolator bracket, 4876, to the firewall.

Figure 21.3.F.1 Lancair gascolator parts





7. Install the gascolator assembly to the bracket using the C5205x8 fitting.

**WARNING:** When a 90 or 45 degree fitting is used, ping or use loctite on the fittings after they are in the correct orientation. This will prevent the gascolator from working lose and potentially sucking air.

8. Attach the gascolator shroud, 4875.
9. Thread a bulkhead 2240-6-8S fitting into the gascolator from the aft side of the firewall, through the hole you drilled.

This sandwiches the firewall between the gascolator and the fitting.

10. Thread an AN816-6D fitting into the 3200x8x6 adapter fitting.

Now you are ready to connect the gascolator to the electric fuel pump that you installed in Chapter 14 *Fuel System* in 14.3.C *Installing the Electric Fuel Pump* on page 14.8.

### Connecting the Gascolator

The following connections need to be made:

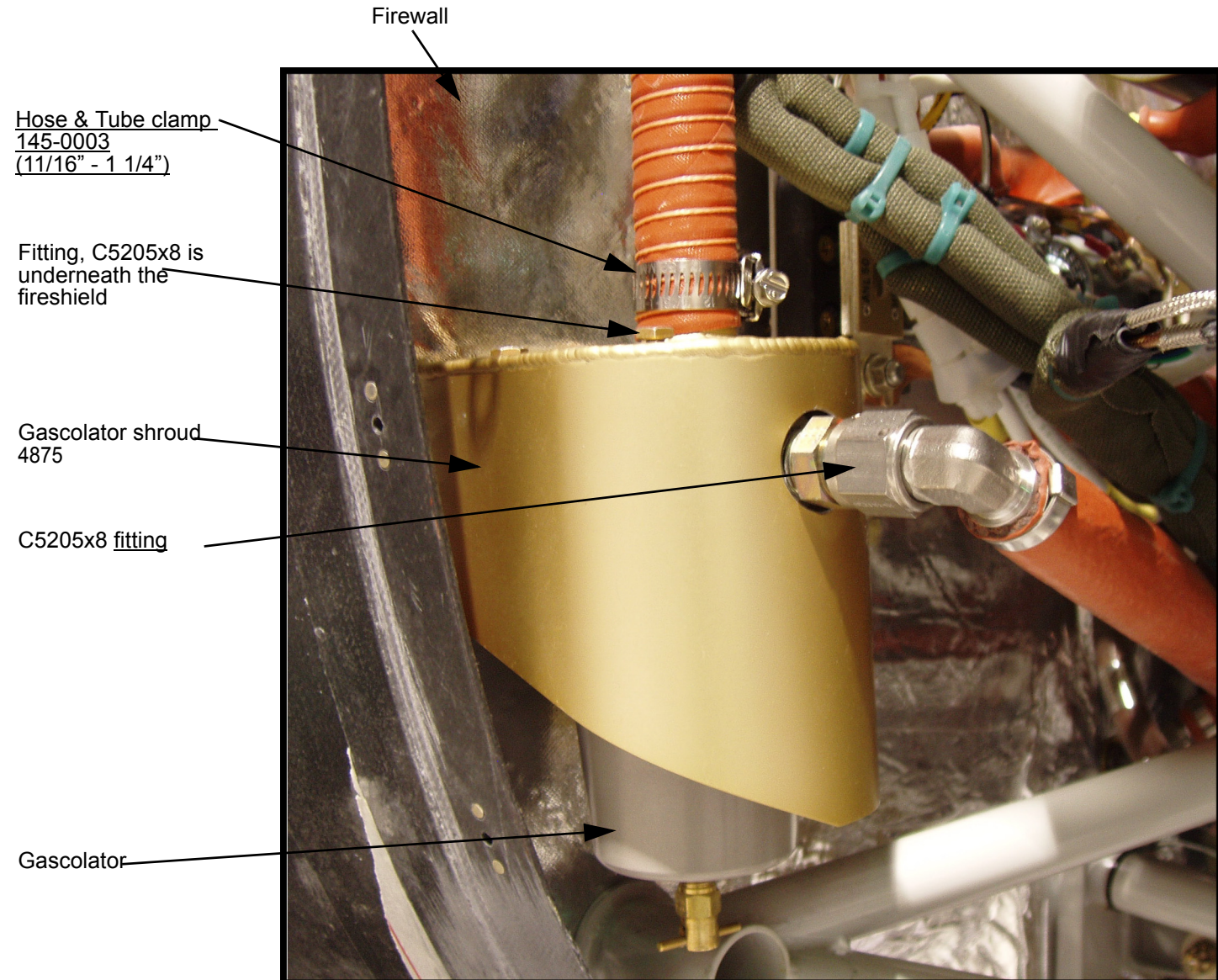
- In connection – from the fuel pump to the gascolator
- Out connection – from the gascolator to the fuel pump
- Top connection – from the gascolator to the baffling port

### Steps...

1. Connect the flexible hose coming from the fuel pump to the gascolator by connecting it to the gascolator fitting on the aft side of the firewall.
2. Attach a straight or 90° fitting to exit the gascolator.  
While we've had no problems with an aluminum AN822-6D fitting, it is common practice to use steel fittings which connect between stationary and moving engine parts. In this situation an AN822-6 fitting is used.
3. Install SCAT tubing at each end. Use the tubing included in the hose kit.
4. Install the inlet flange.

**Tip:** Refer to the blueprint A-504 supplied with the gascolator.

Figure 21.3.F.2 Gascolator installed on the forward side of the firewall





# Installing the Fuel Lines

Remember, after all the fuel supply lines are installed they must be wrapped in fireshield.

## Steps...

1. Verify that all the appropriate baffling flanges have been installed as described in Figure 21.3.C.22.
2. Install the following grommets in the rear baffling.  
Grommet MS35489-13 – for the manifold pressure, see Figure 21.3.E.1.  
Grommet MS35489-21 – for the fuel pressure line.
3. Secure the fuel supply line, 1/2" (12 mm) hose 517, to the engine intake.

**WARNING:** All fuel supply lines are now 1/2" (12 mm) hose. In older versions of the kits and the manuals they were 3/8" (9 mm) hose.

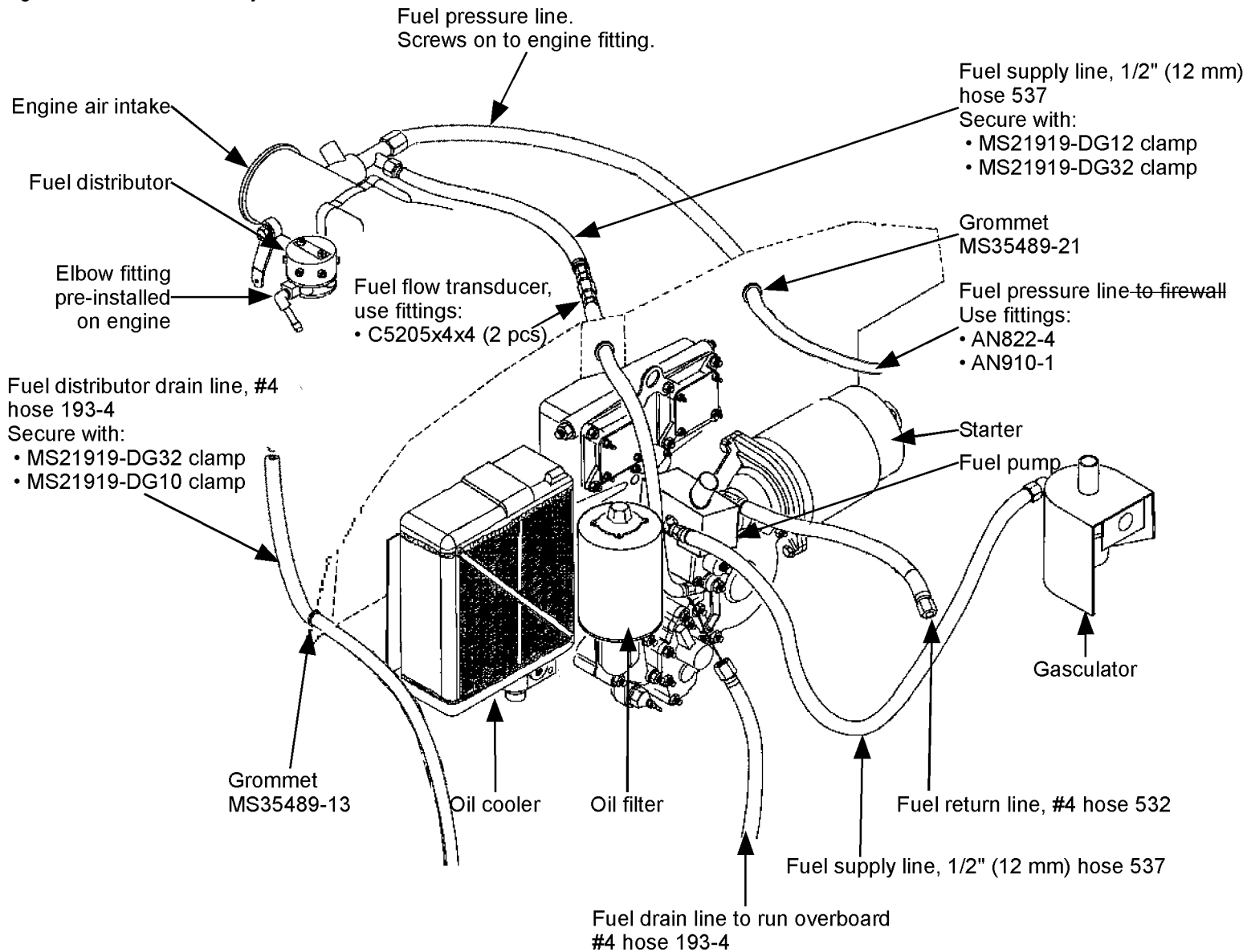
4. On the other end of the same fuel supply line install a fuel flow transducer using fittings C5205X4X4. The fuel flow transducer requires two of these fittings, one on each side of the transducer.  
The fuel flow transducer must be installed following the manufacturer's recommendations.
5. Install another fuel supply line (537) from the transducer to the fuel pump.

6. Install the last piece of fuel supply line from the fuel pump to the gascolator.  
If you have a gascolator without a filter, the fuel filter should be installed between the gascolator and the fuel pump.

7. Wrap the transducer with fireshield.

*Note:* The fuel flow transducer will vary depending on the avionics.

Figure 21.3.F.3 Fuel line layout



8. Secure a fuel pressure line, 510, to the engine intake fitting. Thread the other end of the line through the baffling grommet MS35489-21.  
*Note:* For metered fuel pressure use a 9-420026 fitting.
9. Connect a fuel return line, 1/4" hose 532, to the fuel pump.  
This line will connect to the fuel return bulkhead fitting on the firewall that was installed in Chapter 14 *Fuel System*.
10. Install the following drain lines using 1/4" hose 193-4 and run the lines overboard.
  - fuel distributor
  - fuel pump drain lines overboard. Use 193-4 hose.

Figure 21.3.F.4 Fuel supply and fuel pressure lines



## Assembling the Cylinder Drain Lines

The cylinder drain lines simply provide an escape for excess fuel that accumulates during both priming and after shut down. The fuel is allowed to drain out of the cylinders through these lines and drip out of the snaffle valve or drain which is located on the right side of the lower part of the cowl flange. The HK822-4D 90° fitting has a 0.05" restriction. The lines coming out of each the cylinder down to the union on each side are pre-installed.

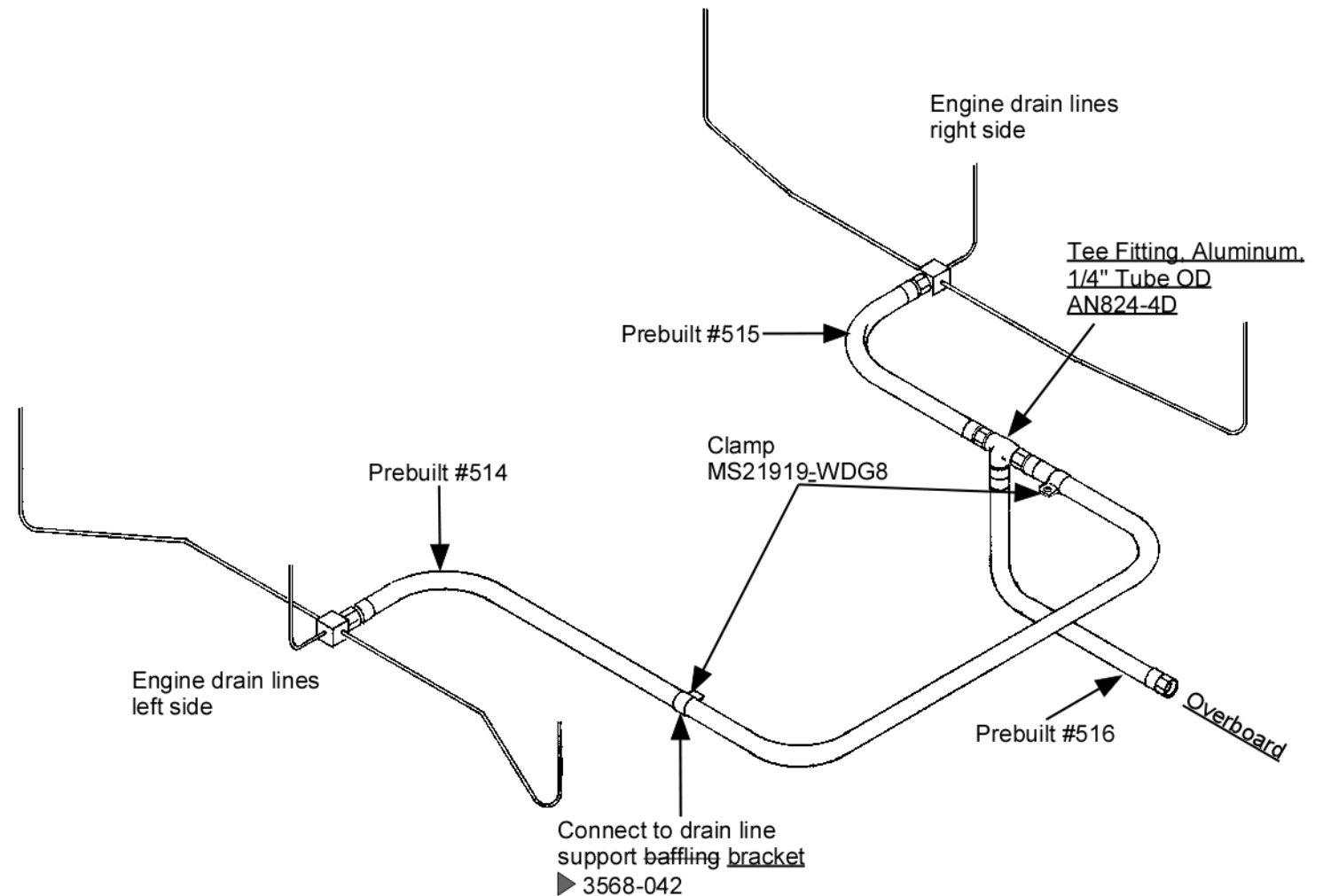
### Steps...

1. Install the FU1 brass block in the cowl flange.
2. Sand it thoroughly and install with Hysol or epoxy/flox. Form a smooth transition from the flange to the brass block using a Hysol/flox mix.
3. Then secure with 2-BID. The block is pipe threaded so be sure to install it in the correct orientation.
4. Drill a hole in the flange and the lower cowl at the location of the hole.
5. Install the cylinder drain lines as shown in Figure 21.3.F.5 at the right.

It is not considered necessary to wrap the overflow lines with fireshield. However sufficient clearance must be allowed between the exhaust and the lines.

📷 Review this photo of the cylinder drain lines.

Figure 21.3.F.5 Cylinder drain line layout



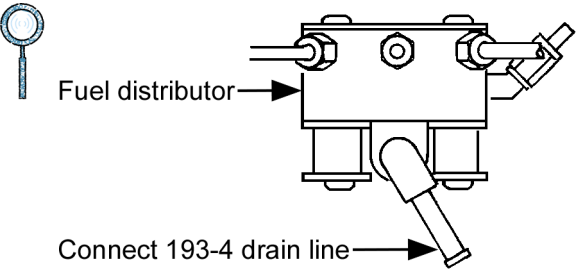
### Assembling the Distributor Drain Lines

In this section you will install a drain line on the fuel distributor that is run overboard.

**Steps...**

1. Install the fuel distributor drain line on the engine's pre-installed 45° fitting.  
The drain is the lower left port in the distributor. See the following detail view of the connection.

**Detail view of the drain line connection**



2. Install a grommet where the drain line hose will go through the baffling.
3. Run the line down and through the rear left panel baffling piece (3568-010).


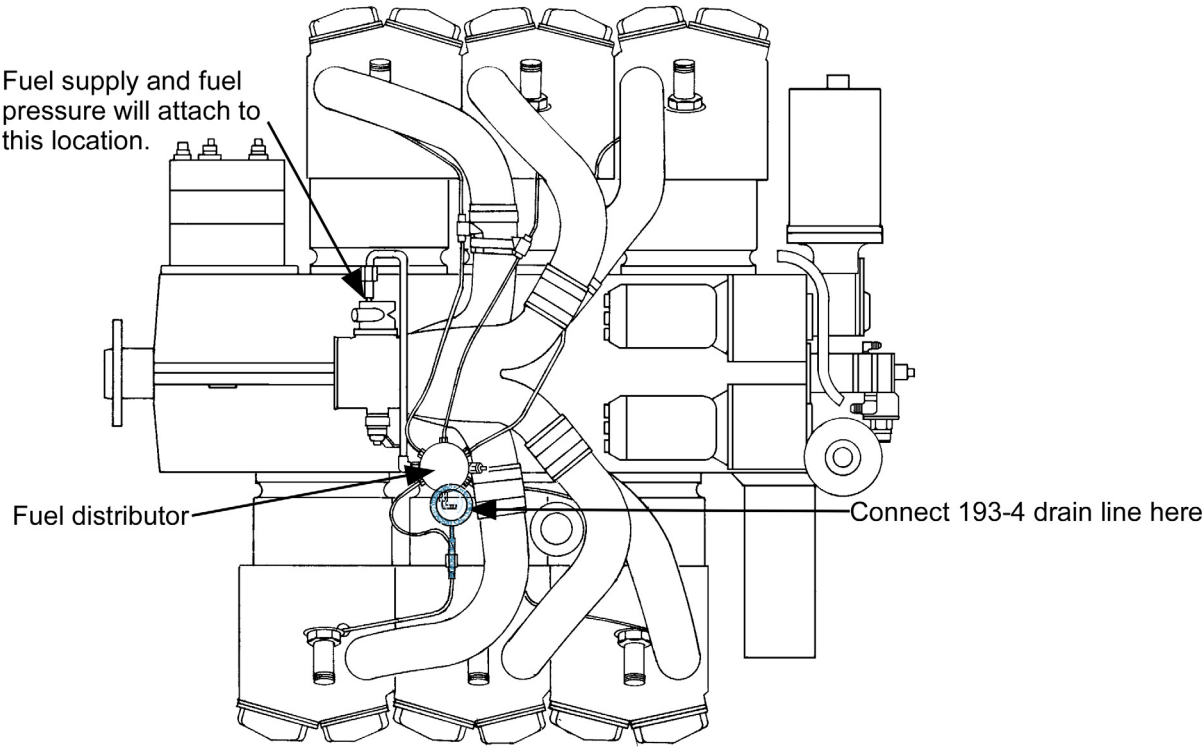
 Review this photo of the fuel distributor.

Figure 21.3.F.6 Distributor drain line layout

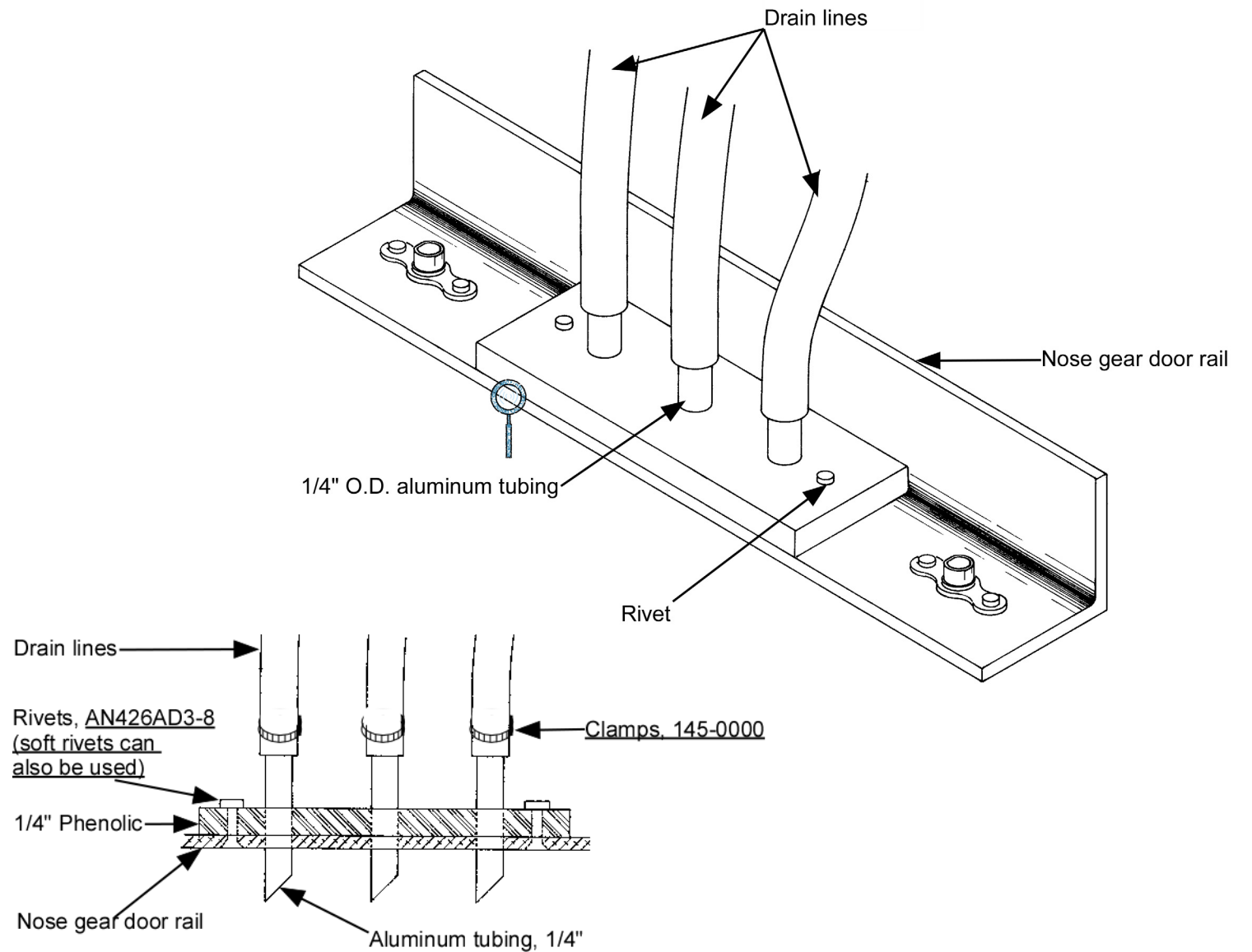




### Drain Line Exits continued...

4. Run the line onto one of the drain line exits on the firewall as shown in Figure 21.3.F.7 to the right.  
**Tip:** The drain exits through one of the 1/4" (6 mm) tubes in the center of the firewall. Refer to the firewall blueprint, [A3586](#).
5. Secure each end with [145-0000 5324K-14](#) clamps.
6. Fabricate and install the overboard line cowl attachments. These lines must be routed overboard. A relatively easy method is illustrated in Figure 21.3.F.7.  
You can use the AN840-4D fittings shown or simply bond pieces of scrap 1/4" (6 mm) aluminum to the phenolic.

Figure 21.3.F.7 Drain line exits



### 21.3.G Engine Oil Systems

The oil system addresses several areas and gauge line installations. An air/oil separator is not required on the Continental IO-550N engines. There are no ports for returning the oil to the engine.

All oil lines must have fireshield covering.

#### Installing the Oil Pressure Transducer

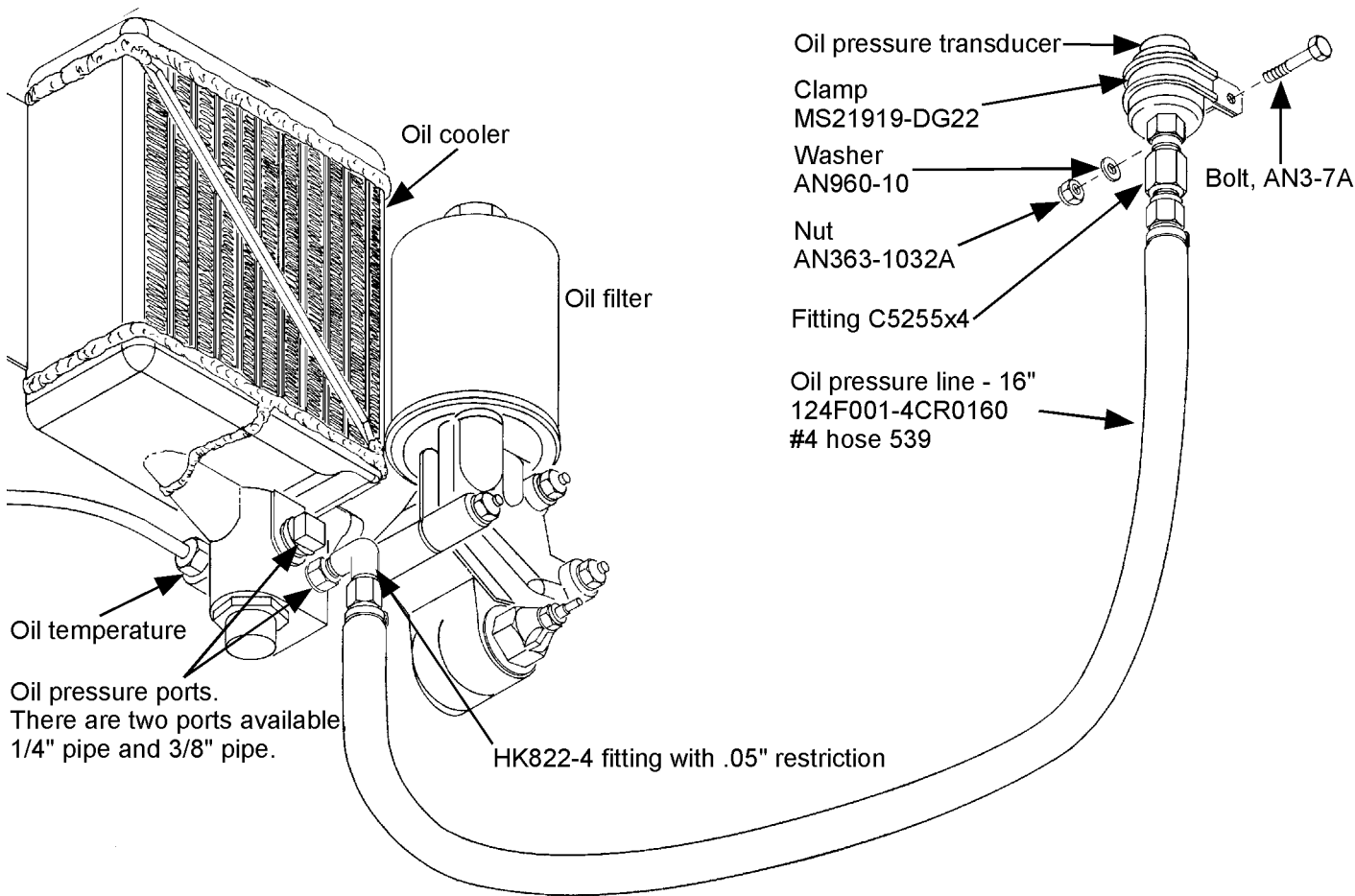
**Steps...**

1. Secure the oil pressure transducer to the firewall using the a clamp supplied with the transducer (MS21919-DG22) with a bolt (AN3-7A), washer (AN960-10) and a nut (AN363-1032A).  
The clamp is usually supplied with the transducer.
2. Install the line to the transducer using a C5255x4 fitting on the #4 hose.
3. Install the oil pressure line to the oil pressure port using a HK822-4 fitting.

#### Oil Temperature Sensor

The oil temperature pickup is located at the bottom of the oil cooler. It is designed to accept a common brass type screw in thermocouple.

Figure 21.3.G.1 Oil pressure and oil temperature sensors



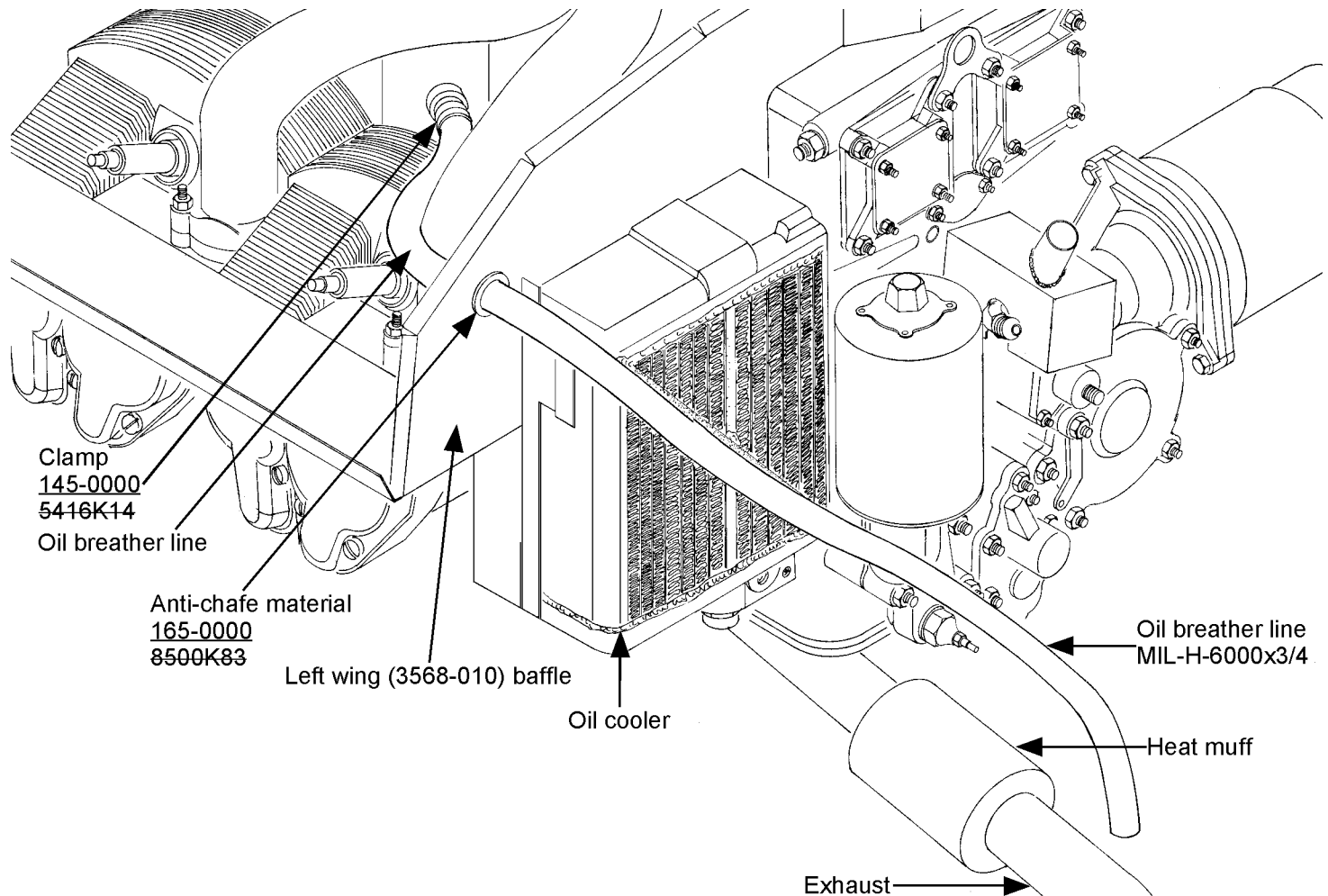
## Oil Breather Line

The primary purpose of the oil breather line is to vent the crank case to the ambient pressure. Fumes will escape through the breather line and any oil particles will burn off on the engine exhaust. Note that negative -G maneuvers can cause large amounts of oil to expel through the breather line.

### Steps...

1. Secure the oil breather line with a 145-0000 ~~5416K14~~ clamp.
2. Install anti-chafe material where the breather line runs through the left wing baffle.
3. Secure the exit to the firewall such that any oil discharged the breather line drips onto the exhaust and is burned off.

Figure 21.3.G.2 Oil breather line



### 21.3.H Installing the Propeller/Spinner

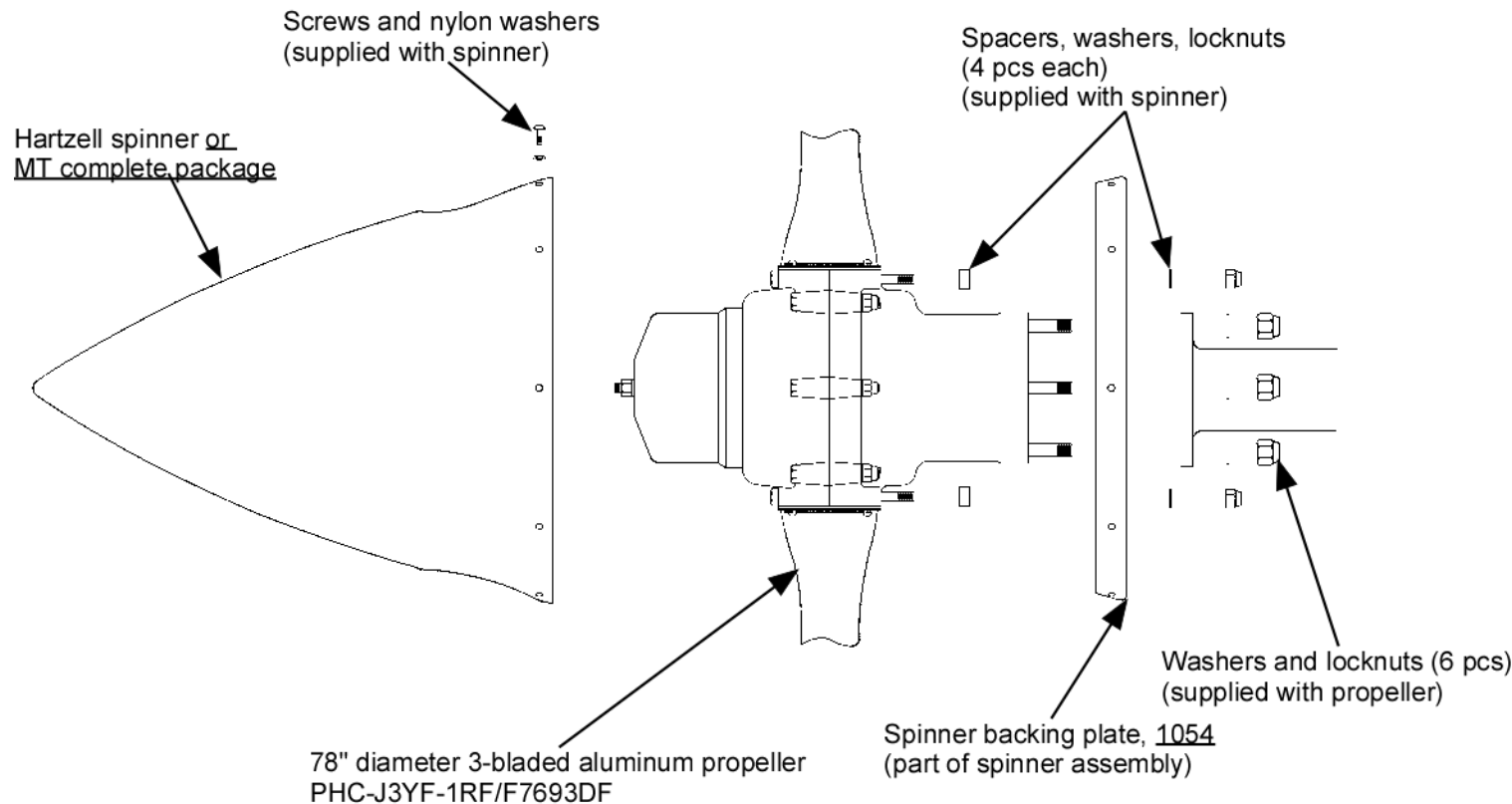
Currently, the Hartzell three-bladed propeller (PHC-J3YF-1RF/F7693DF) is the only approved prop for the Continental IO-550N engine.

Figure 21.3.H.1 provides a general overview of the propeller installation. For specific installation instructions refer to the manual that accompanied your propeller.

The composite spinner (1054-1), backing plate (1054) and the hardware is available at no charge. Contact KCI for the spinner kit and parts.

You can also build a composite spinner. Request the instructions from Lancair.

Figure 21.3.H.1 Spinner installation





### 21.3.I Installing the Cowling

Before you start the cowling the propeller and the spinner backplate must be installed. We suggest that you remove the spinner and cover the propeller blades to avoid scratching them. Before you start this section the aircraft should be leveled for reference. See 6.3.C *Setting the Bottom Fuselage to Level* on page 6.6.

The cowling aligns in front to the spinner and in the rear to the fuselage. You will need to cut out the lower cowl for the nose gear clearance hole.

#### Steps...

1. Measure and cut an opening in the lower cowling (2000B) for the nose strut. Cut the opening just large enough to start fitting the cowling.

Once the cowling is properly aligned you can gradually trim the opening to the exact dimensions.

2. Align the lower cowl using spring clamps to hold it in place.

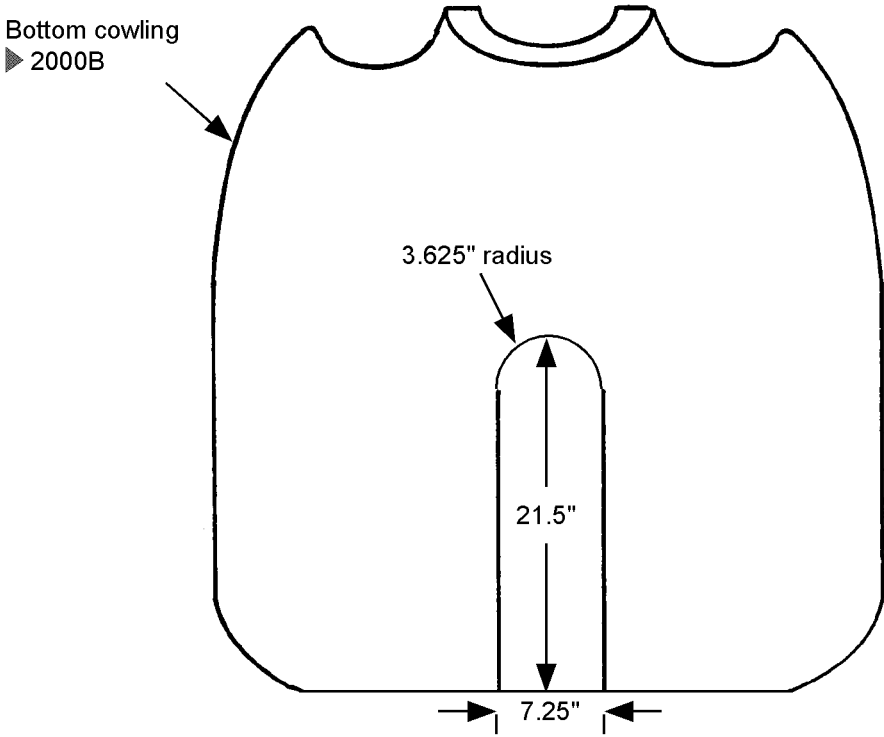
When the engine is running it pulls down a little so we generally set the cowling 1/8" to 3/16" below the spinner. Also allow for a 3/16" clearance between the spinner and the cowling. Trim excess material off the back along the lower cowl joggle where it overlaps the fuselage joggle.

3. Align the upper cowl in a manner similar to the lower cowl.

Note that at first the cowling may appear to backlock at the air inlets. If this is a problem grind a little off the lower cowl joggle to eliminate this backlock.

See the instructions on the next page for drilling the holes.

Figure 21.3.I.1 Cowling nose strut opening



4. Drill the holes using the following method.

When you drill for the Cleco holes, (these holes are eventually used for the screws) mark all the holes and then drill only the holes at the fixed locations.

- On the lower cowl (2000B) start at the bottom and work your way up along the side
- On the upper cowl (2000T) first make sure the cowl is well matched in front and then start drilling in the aft center where it secures to the fuselage.

- Next work your way down the side making sure the cowling is pulled nice and tight.
- Last, drill for the sides.

As you drill each hole keep checking the fit of the rest of the cowling.

5. Cut the oil access door opening in the upper cowl.

See Figure 21.3.I.4 on page 21.48.

6. Next cut the oil access door latch area in the door using the dimensions in the following Figure 21.3.I.3.

Figure 21.3.I.2 Cowling screw pattern

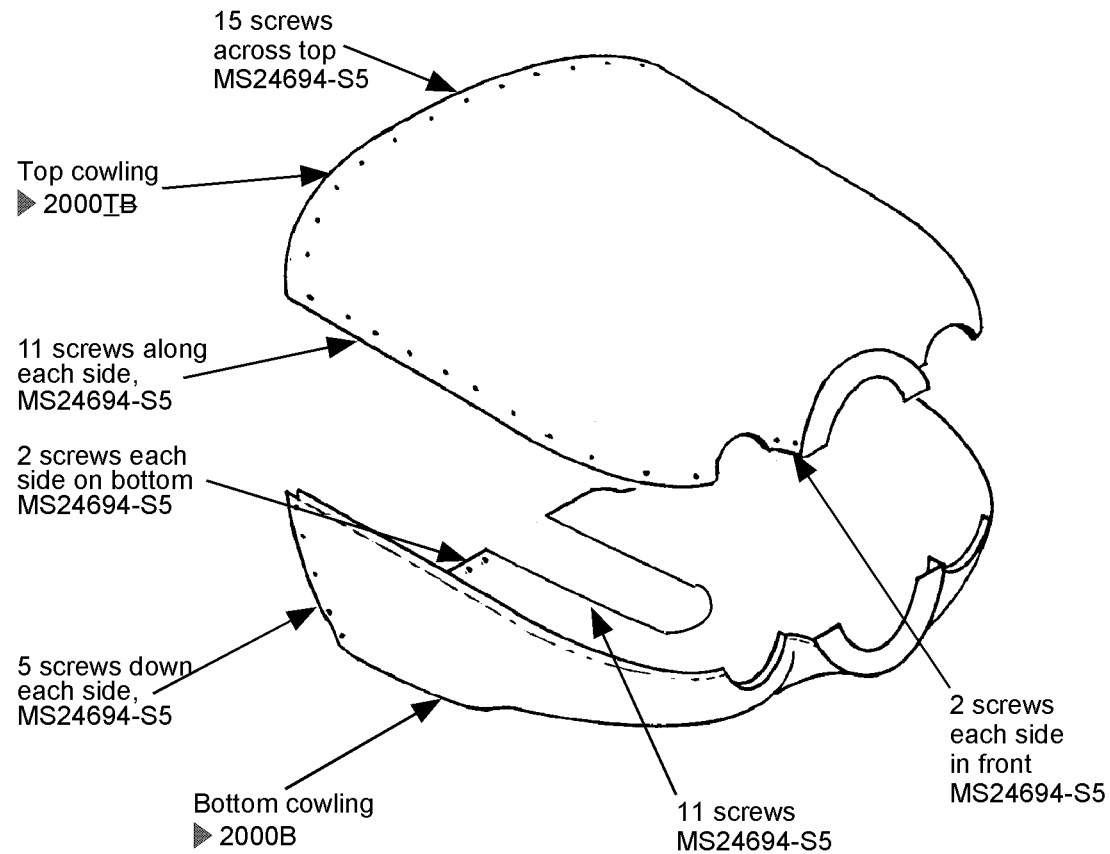


Figure 21.3.I.3 Latch dimensions for the oil access door

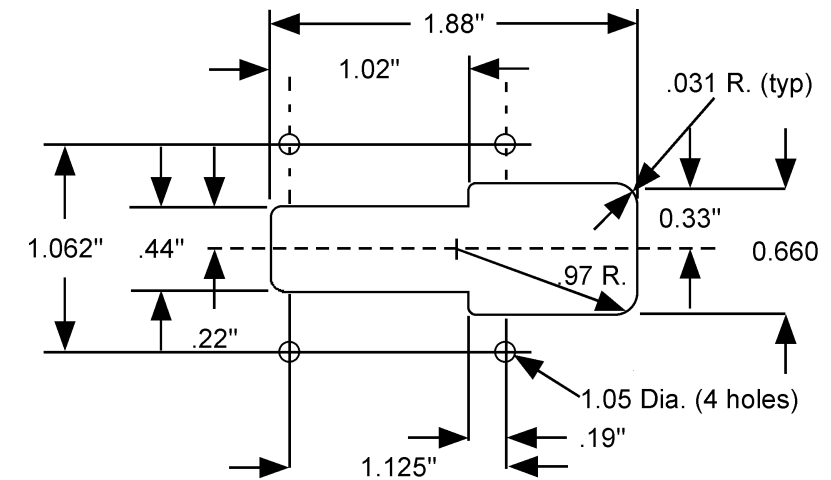
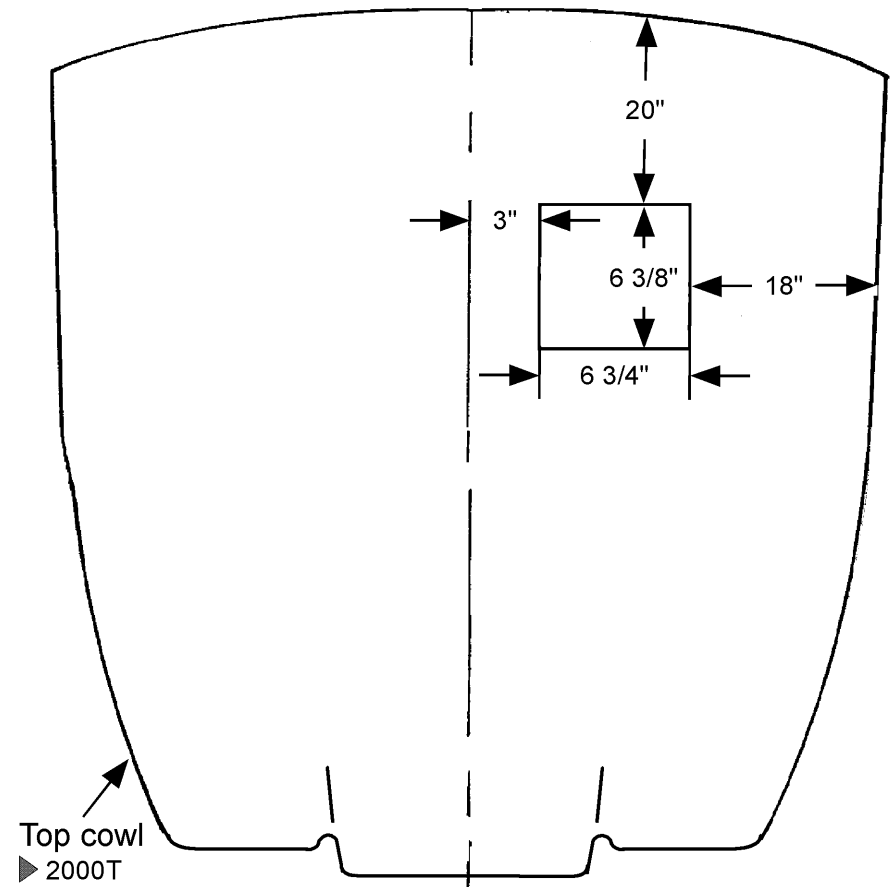


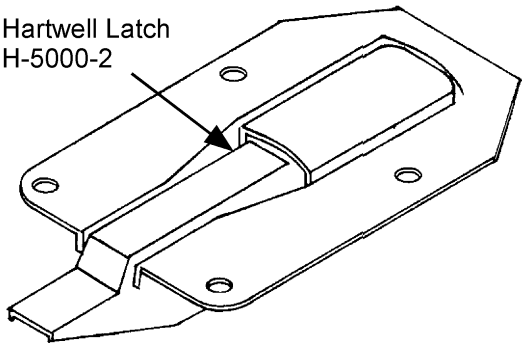
Figure 21.3.1.4 Oil access door in upper cowl



7. Cover the door with the 4-BID.  
Add a 4-BID ply schedule over the door (once the core is trimmed down to shape) and the perimeter of the opening on the top cowl. This is to stiffen the area since the force from the plenum chamber formed underneath is quite high.
8. Hold the door in position and having release tape on it, lay the 4-BID ply schedule around the hole perimeter on the top cowl. See Figure 21.3.1.4 for the location in the upper cowl.

- Extend this 4-BID about 1-1/2 inches all around the door hole and extend it at least 1/2" (12 mm) onto the door to form the joggle.
9. Trim the cowl core back around the opening.  
Trim the joggle in the cowling to 3/8".
  10. Trim the door so it fits in the joggle.
  11. Install the hinge (MS20001).  
The joggle needs to be trimmed away to fit the hinge and you'll need to notch the door to accept the center portion of the hinge.
  12. Install the latch.  
A typical Hartwell latch (H-5000-2) installation is shown. This latch can be either riveted or bonded into position. If bonding, floc it into position and add 3-BID over it to secure the edges.  
You will need an oil door remote latch kit (802-0001) to complete this installation.

Figure 21.3.1.5 Latch installed in oil access door



### Bodyworking and Seam Finishing the Cowling

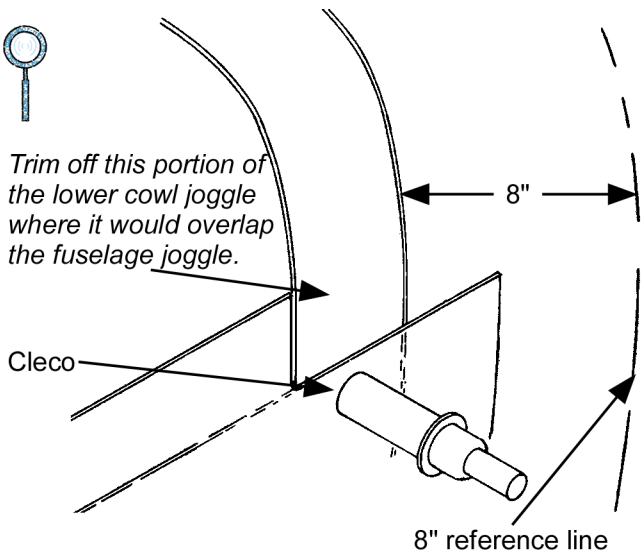
You need to use micro to finish the seam between the fuselage and the cowl.

#### Steps...

1. With the cowl installed, prep and spread a layer of micro along the joint between the cowl and the fuselage. Spread the micro using the required thickness but keeping it as thin as possible.

You don't need to bother laying release tape or anything else. Simply spread the micro right over the seam.

#### Detail view of the cowl and fuselage joint



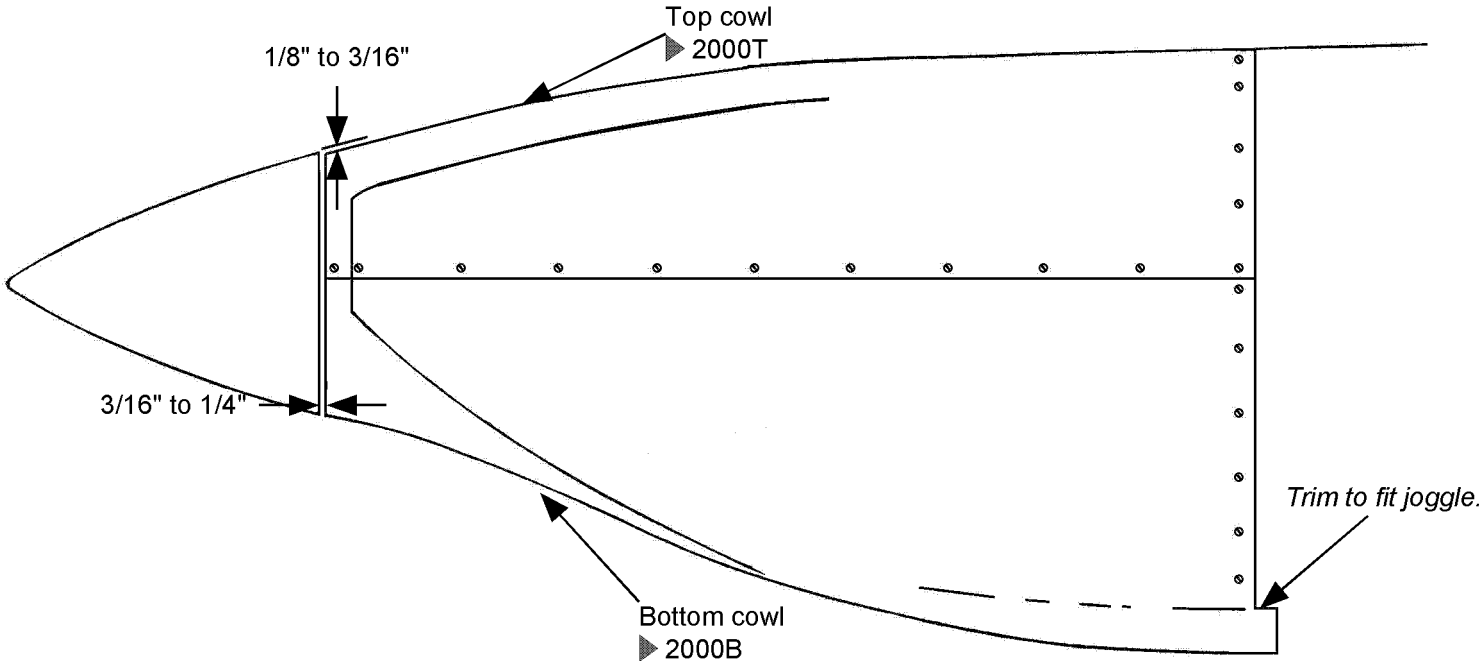
2. When the micro is slightly firm but *NOT* set up, take a knife blade, twist it slightly sideways and run it around the joint. This should be a quick and simple circling motion. Stay in the joggle keeping the knife blade against the cowl edge which has a good edge. Keep the knife slightly twisted to set the size of the gap. It is okay if the micro mounds up slightly.

3. Let the micro cure.
4. Sand the micro smooth, removing the slight mounds.
5. Remove the cowl and complete any final prep to the seam.

Now you've got a great seam!

At this point you are ready to install the nose gear's fairings.

Figure 21.3.1.6 Cowling seams





### 21.3.J Installing the Induction Air Filter

#### Steps...

1. Install the air induction tube (4867) using an AN5-16A bolt and two AN960-516 washers.
2. Secure the air induction tube to the engine using the hose coupler (4869) and two hose clamps (~~145-0009~~ ~~5416K-25~~).

**Tip:** You will need to replace the crankcase bolt with a longer bolt (AN5-16).

Use the existing washers.

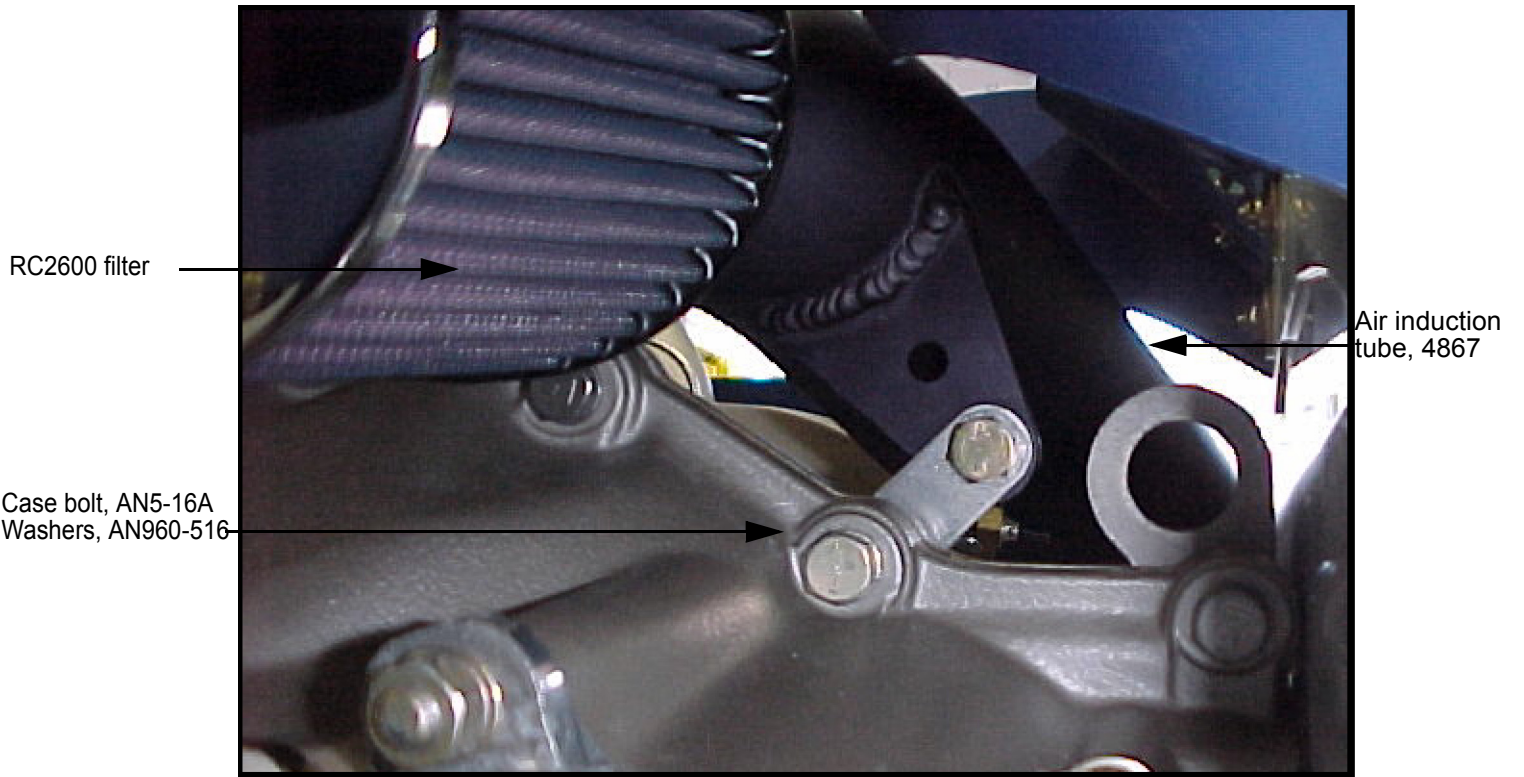
3. Drill a 1/2" hole through the left wing baffling.  
Place the hole between the fresh air inlet and the oil cooler door.
4. Install a rubber grommet (MS35489-6) in the hole to prevent chaffing.
5. Bolt down the cable using one of the baffling brackets (FM-3568-042).  
Use a bolt (AN3-4A), washer (AN960-10) and a nut (AN363-1032) to secure the bracket.
6. Build the lever arm assembly. Make sure the arm is back and down as shown in the following picture.  
Review this photo of the lever arm.  
Use a lever arm (4867-01), a socket-head screw (~~101-0060~~ ~~91251A153~~), a washer (AN960-0) and a metal stop nut (MS21042-06).
7. Cut the spacer (4878) to a length that will prevent an extended pull of the cable.
8. Thread the spacer on the bearing rod end (HFC-3).  
The spacer will prevent damage to the butterfly valve inside the induction tube.
9. Bolt the rod end to the lever arm induction assembly.  
Make sure the lever arm groove is facing up and the bolt (AN3-7A) is inserted from the bottom up. The lever must be in alignment with the butterfly valve.
10. Install two washers between the bracket and the engine case.

Do not overtighten the bolt through the rod end bearing and arm. If you do, this will lock the open and close movement of the cable.

11. Test the cable by gently opening and closing.
12. Tighten the case bolt to 15-18 ft. lbs.

Review this photo of the control cable location.

Figure 21.3.J.1 Induction air filter



### 21.3.K Optional Vacuum System

This section describes the installation of a vacuum system consisting of an artificial horizon and a directional gyro. The kit we provide for this configuration is ~~listed in LES-550-VC.~~

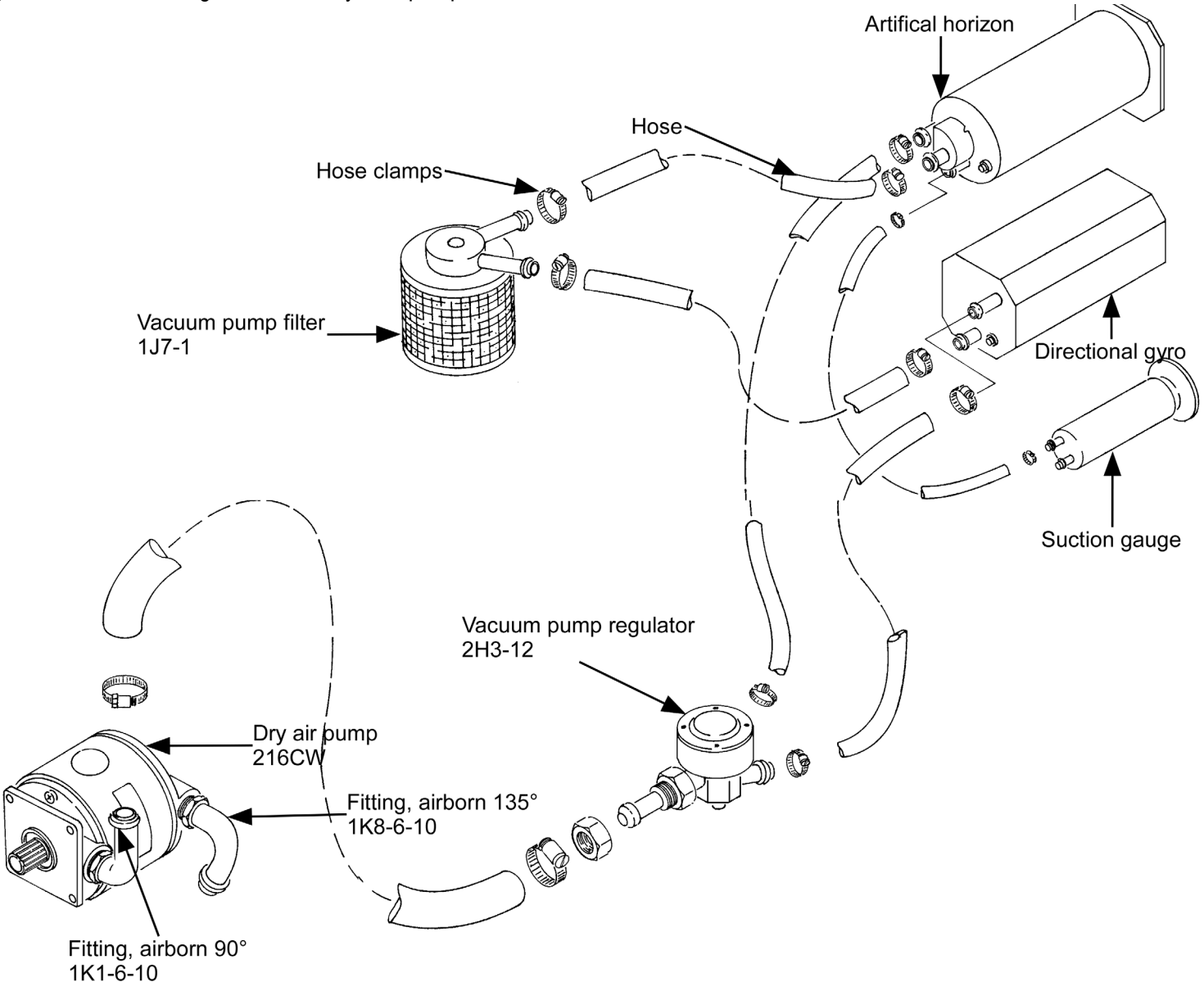
The angled fittings in and out of the vacuum pump are not standard AN fittings. 90° AN fittings may cause approximately a 1/2 psi drop per fitting installed.

#### Installing the Vacuum System Pump

Follow the instructions included with the vacuum pump for installing the fittings.

1. Install the 1K8-6-10 fitting on the exhaust side of the pump.
2. Mount the vacuum pump on the right mounting pad of the engine.  
The vacuum pump is normally oriented so the ports are on the top of the pump. It may also be mounted at 90°.
3. Install the vacuum pump regulator on the firewall.  
The vacuum pump regulator installs easiest on the firewall. Refer to the firewall layout blueprint, A3586
4. Mount the air filter aft of the firewall. The firewall brace is a good location.
5. Install the hoses, clamps, and fittings as shown in Figure 21.3.K.1.  
193-4 – Hose low pressure 1/4" I.D.  
193-6 – Hose low pressure 3/8" I.D.  
193-10 – Hose low pressure 5/8" I.D.  
145-0001 5321K16 – Clamps for hose 1/2" O.D.  
145-0000 5416K14 – Clamps for hose 1" O.D.  
AN840-4D – Hose nipple fitting 1/4-1/8  
AN840-6D – Hose nipple fitting 3/8-1/4
6. Install the shroud (1058) over the vacuum pump.

Figure 21.3.K.1 Installing the vacuum system pump



21.3.L Factory Installed Baffling

If you are installing a used engine, make sure you install the center and lower cylinder baffles listed in the following table. They are critical!

Index	Part Number	QTY	Description
50	643352	2	Baffle Assy. Cyl. 1,3 & 4,6
50	643353	2	Baffle Assy. Cyl. 3,5 & 2,4
51	643358	1	Base Baffle Cyl. 2,4
51	643364	3	Base Baffle Cyl. 1,3 & 4,6 & 3,5
52	643359	3	Baffle support
52	646868	1	Baffle support
53	AN3-80A	4	Bolt
54	AN520-10-7	4	Screw
55	AN960-10L	4	Washer
56	533210	1	Spring

Refer to the parts catalog for more information.

